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BRITISH MEDICAL JOURNAL

LONDON SATURDAY APRIL 17 1943

STRATEGY AND TACTICS IN RESEARCH*

BY

F. M. R. WALSHE, M.D., F.R.C.P.

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Of the various fields of medical activity now coming under review in the discussions being held on the future of medicine in this country, that of research must command its full share of attention. If the greatest possible advancement of knowledge is to be secured, those in whose hands the reorganization of medicine will lie need a sound conception of all that is embodied in the idea and in the execution of research. We may not assume that everyone eager to provide us with a bright new medical world has the experience or insight necessary to deal with the problems of medical research, nor even that all of those actually engaged in it are endowed with the clearest vision on the subject. Some familiarity with the literature in which original investigations in my own field of medicine are recorded, various discussions that I have listened to, and schemes of research upon particular problems that I have known propounded have led me to believe that not a few of those who engage in research work, or who find themselves—often for quite irrelevant reasons—in a position to initiate and control it, have extremely limited views as to what constitutes good research, how to plan and set about it, or how to interpret and use to the best advantage the results it yields. The present time therefore seems apt for an attempt to formulate some general principles of a strategy and tactics of research. I shall concern myself principally with medical research, but my remarks may possibly have a wider application if they are well founded.

Research in the Past

Until comparatively recent times medical research has been pursued largely in the voluntary hospitals and their medical schools. Most of those from whose ranks the original workers were mainly recruited—namely, the honorary medical staffs—have from the nature of the voluntary hospital system been compelled to gain their livelihood by the private practice of medicine. As a result clinical research has been hampered in its full development, for those engaged in it have found themselves increasingly drawn away by the demands of practice, until in middle life most of them are compelled to relinquish all hope of serious original work. Even under conditions so adverse, their achievements in the past have been considerable, and have provided the foundations upon which a more fortunately placed younger generation may now build. Perhaps not all of this generation realize fully that some at least of the broad perspectives now opening before them they enjoy because they are, as it were, standing on the shoulders of their unsubsidized predecessors. Some of them, it may fairly be urged, are inclined to scorn the base degrees by which they did ascend, and therefore a tribute to the labours of past generations in advancing medical knowledge is not wholly superfluous.

Yet under these past-time conditions advance was uncertain and somewhat fortuitous, and none will deny that the increasing pace of scientific work requires that greater opportunities for clinical research should be provided. The growing complexity of the problems before us, and of the research methods essential to tackling them, makes greater demands upon the individual than in the old days when the hewing out of the rough features of medical knowledge by relatively simple methods was possible for men who, in more leisurely times, were also engaged in the practice of medicine and surgery. Research is becoming increasingly a matter of ever finer analysis of fundamental bodily processes by technical methods of great complexity, and is too exacting a mistress to be satisfied with less than the first claim on the worker's endeavour.

Despite the steady increase of opportunities for the free pursuit of clinical science that the past 20 years has provided, further opportunities must be forthcoming if British medicine is to regain its position in the van of progress. It is not my prime purpose to discuss how far simple organization can achieve this result. Of organizers we need fear no dearth, nor of those ready to place all their hopes in planning and to cherish the most sanguine expectations as to what can be achieved by committees. My first concern is to consider the part that must be played by those who do the research work if this is to yield a good harvest.

One of the outstanding features of medical research of the past is that for the most part only the man with the urge to explore the unknown engaged in it. He could hope for no material reward from doing so. Indeed, he might easily suffer from his preoccupation with original investigation. It offered him no prospect of a career; what we may call the professional researcher in established laboratories was apt to look askance at him as an amateur, nor could he expect to join the select ranks of press-famous doctors by devoting himself to it. In fact, he too often ended as one of those pathetic figures of whom we used to see it stated in obituary notices in our medical press that "he did not attain that success in practice that his merits entitled him to, but his colleagues appreciated his worth."

Only the rare man who combined insatiable scientific curiosity with abounding vitality and enthusiasm could succeed in both research and practice. Victor Horsley was such a man, but we cannot tell when we may look upon his like again. Hughlings Jackson, to take an outstanding example of the original thinker in medicine, thought long and profoundly on the problems of neurology and psychology and greatly enriched knowledge because it was in him to do so and would not be denied. It is as difficult to believe that any formal organization of research in his day would have made him more productive as it is to suppose that English poetry would be any more rich and lovely than it is had all poets in the past been given salaried posts and relieved of financial difficulties: a thought that we

* Being a paper read before the Society of British Neurological Surgeons on Aug. 1, 1942.

may well ponder when thinking of the possibilities of mere planning for achievement in the realms of the mind.

The subsidizing of medical research has grown and will continue to grow, and thus many now engage in it, and will in future do so, who in days gone by would have been neither willing nor able. Their compelling motives are many and various. As always, a few have the true vocation and eagerly embrace the enhanced opportunities now opening before them. Many enter research for more pedestrian reasons: some because it offers a safe refuge from the exhausting labours, responsibilities, competition, and financial uncertainties of private practice; others because it affords them the illusion of an intellectually higher life; a few, perhaps, because they are misanthropes who, in the laboratory, can hope to escape contact with their kind; some just choose it upon a dispassionate calculation between the various openings a medical training offers them; and some, alas, merely as a stepping-stone to more attractive adventures in other fields of medical activity.

The True Discoverer

Whatever their reasons, a growing army of men and women are enlisting in the ranks of original investigators. Of all these, however, we can look for very few in the first ranks of true discoverers: those who infuse their technical competence with scientific imagination, who see their problem in essence before they proceed to tackle it; who know how to ask the experimental questions best calculated to elicit from Nature the relevant answers; who not only add new facts to store but see their significance and can embody them in the ordered knowledge that is science. Not content merely to dig for gold, they also refine it, knowing that it is useless until they have done this, and that isolated pieces of information are merely the raw material of knowledge. A capacity for the unresting contemplation of the facts of observation is their surest and peculiar weapon and their guide in experimental work. They are the strategists of research.

No planning can provide us with these men or determine the goal of their labours. When they possess the added gift of being able to attract younger men around them their powers of discovery are immeasurably enhanced; for they can train their successors, and can direct the labours of workers of lesser rank, the tacticians of research who when a problem is formulated can devise a means of tackling it. Under them also work the third rank of research workers, to whom can be confided limited and precisely defined tasks in the larger plan of campaign.

Here we have a sort of spontaneously arising organization that has grown round a personality and has owed little or nothing to deliberate planning. When this comes into existence it is the richest of all sources of original knowledge. Within our own time and in this country, physiology, biochemistry, and clinical science have given us brilliant examples of such schools under the leadership of Sherrington, Gowland Hopkins, and Thomas Lewis. Woollard, had he lived long enough, might have established such a school in anatomy. Given such leaders, research of the first order will flourish, however scanty the material resources available, however negligible the organization from without. Going further afield, we have a striking illustration of this in the school of Magnus of Utrecht, a true offshoot of the Sherrington school of physiology. Over a period of years a sequence of closely related investigations upon the physiology of body posture came from this active centre of research, and was recorded in a series of papers that were a model of what such records should be: concise, crystal-clear in language, and with step following logical step in the presentation of facts and argument. All this work was carried out in a cramped and ancient building, once a plague hospital, as ill adapted for modern research as may be imagined and as poorly endowed. Yet the personality of the leader inspired a band of paid and voluntary workers—de Kleyn, a practising surgeon, being one of the latter—to complete one of the most fascinating chapters in the records of neurophysiology. In short, it is round the man and not round the plan that the wheels of research revolve most rapidly.

All this is not to deprecate some attempt to organize our resources, but rather to indicate the limits of what planning and research foundations can achieve. Geniuses for research are not created by committees; they are not even invariably recognized by them in time to afford them support. By the time Magnus at Utrecht could look upon a new and fully equipped laboratory his last experiment had been made.

Lines of Approach in Strategy and Tactics

These considerations bring me back to my starting-point—namely, the great importance of sound ideas as to a strategy and tactics of research if the greatest efficiency is to be attained. Perhaps some apology is called for from me at this juncture. It may be thought that only one whose active life has been spent in research can be competent to discuss this question. Up to a point this is probably true, yet, after all, the onlooker sees a great deal of the game, and it is as an interested spectator of the fields of neurophysiological and clinical neurological research during the past quarter of a century, and for part of that time associated with the editorship of *Brain*, that I venture to give my impressions of the quality of strategy and tactics to be seen in these fields of medical and allied research.

Claiming no more than this, then, I submit that a sound research strategy connotes a familiarity with what has already been accomplished in the field of investigation to be explored; but it calls for more than this—namely, for a clear grasp of the implications of earlier work and some discernment as to where it is probably leading. Some pattern has to be sought in the numerous and often seemingly unconnected items of information available, and the gaps in this have to be recognized as the field of knowledge is critically surveyed, since from this recognition it may be hoped to get a lead as to what questions remain to be answered before the complete pattern of the bodily function or process under inquiry can be revealed. The strategist's scientific imagination will show him what lines of approach offer the best hopes of success, and when to abandon any given line and start afresh. He may have, and must be able, to recast his ideas completely regarding the nature of his problem should unlooked-for results make this necessary. This in turn requires that he shall have the intellectual integrity and clarity to sacrifice his provisional hypotheses to the facts if these demand it. Experience shows that this dilemma is not always successfully solved by the research worker; for his hypothesis may have become dearer to him than the facts, which he then proceeds to tidy up in conformity with his preconceived notions, turning a blind eye to one and "modifying" another. By tactics of research I have in mind the drawing up of a precise experimental plan, once the general intention of the research has been thought out and formulated. It implies the devising of experiments—that is, of questions designed to extract the answers from Nature. In doing this the worker shows his capacity for cross-examining Nature and his purpose in doing so. His experiments, therefore, are not well-intentioned gropings in the dark but skilfully directed probings. Some there are who, while not being strategists of the first order, are adept in this tactical planning once the purpose of an investigation has been defined for them. Now, in the world of scientific activity as we find it there are not enough strategists of the first rank to go round, and thus it comes that many investigations are carried through with no longer view than the acquisition of some piece of information as an end in itself without any clear thought as to its possible implications. Once gained, this piece of information is put on record, but its orientation in the larger field of related knowledge and its building up into a general body of thought seem beyond the vision of the workers. Indeed, we sometimes ask ourselves what was in their minds in undertaking it. They have, as it were, rooted up industriously a sort of scientific truffle and have then promptly lost interest in it. The journals are full of these bits of isolated work, of which it may be said that they are no more than the raw material of knowledge. Not a few workers pass their active lives going from investigation to unrelated investigation on no discernible plan, never pausing to contemplate the full implications of their work, but, with an unresting haste and an apparent horror of contemplation, proceed on their mission as collectors of information. Sometimes one cannot but suspect that they cherish the illusion that he who publishes four papers is a better man than he who produces but one, and there is not a little in the current standards of values concerning these things that encourages them in this dreadful notion. Concerning these standards and

the question of the productivity of the research worker I shall have something more to say later.

Now, the research worker of the first rank does not leave his facts of observation lying on the grass in this unfinished state, nor does he collect facts just for the sake of doing so. He extracts the last grain of significance from his observations before he leaves them to pass on to a logical next step in his planned campaign of investigation. It is true, of course, that the raw material of less polished labours may from time to time provide him with essential links in some chain of evidence or, illuminated by his thought, may come to have crucial importance. Yet this is no justification for research work as lacking in purpose as in method. At the other extreme we find scanty or ill-substantiated observations made the foundation of some elaborate structure of hypothesis which they cannot support. To this variety, also, the literature of research is no stranger.

Shortcomings in Research

But perhaps the most pitiful travesty of original investigation is that undertaken for some irrelevant reason, such, for example, as that research work gives a committee, an institution, or a hospital a good name, and creates an atmosphere of scientific glamour highly gratifying to those promoting it or engaged in it. An apt variety of this aimless activity was the scheme I once heard proposed to take polygraph tracings from all the patients admitted to a certain institution over a twelve-months period, on the naïve expectation that "something's bound to emerge!" No one paused to ask what might be expected to emerge, or how, once emerged, it was to be recognized as a significant phenomenon.

Not less unpromising were the labours of a committee within whose terms of reference it was to initiate and support schemes of research, when it met to think out from the inner consciousness of its component members things to research about, much as one might ask at a children's party, "What shall we do next?" Closely related to this conception of research is the notion that all that is needed is an elaborate questionary for a collection of assorted workers of unknown capacity to conform to and to fill in, some statistical amateur then to distil knowledge from the completed returns. From this Gallup poll to research by automatic calculating machines seems but a brief step, for the use of the intellect has been virtually done away with.

But lack of imagination is not the only shortcoming of much modern medical—and other—research. A not less pervasive evil is the tendency to accept statements of fact, and even hypotheses, on trust, more especially when they emanate from writers to whose name prestige attaches. Prestige, indeed, may be a deadly peril in scientific thought. Every statement and every hypothesis on record must stand or fall on its merits, irrespective of its author. Nothing is more common than to read in the opening paragraphs of an original paper the phrase, "So-and-so has shown that," when more often than not "So-and-so" has shown nothing of the kind—he has only said or suggested it but has not demonstrated it. Once thus referred to, a false air of reality attaches to the statement and it passes insensibly into the category of things we accept as proved, where as likely as not it does not belong. In this way a hypothesis with no demonstrable validity may obtain a measure of acceptance and a lease of life to which its merits by no means entitle it—and it may even hold up fresh thought for a generation by its malign influence. Yet really critical examination would have revealed from the outset that it was fallacious or unsubstantiated. That this should be so is a reproach, and suggests that what I have spoken of as the unresting contemplation of the facts of observation does not engage original workers to the degree it should.

Necessity for Critical Analysis

This brings me to the role of critical thought in the field of research. This, and this only, can keep the world of original thought alive and fresh, can sort the wheat of sound hypothesis from the tares of rash and ill-thought-out speculation, the ephemeral from the lasting. When one considers the flood of papers dealing with new observations—or rediscoveries of old observations—that surges about us in a rising tide each year, it is clear that the imperative necessity for quite ruthless critical analysis becomes even greater. Yet who wants to shoulder this role of intellectual inquisitor? No one, indeed, with any regard for his own advancement or peace of mind. It has become the craven fashion to decry critical analysis by attaching to it the unpopular name of "destructive criticism." Yet we must clear the ground of the lumber of unreliable observations and unsupported hypotheses before advance is possible. Those of you who have read—as we all should read—Trotter's *Collected Addresses* will find in them the following passage, which cannot be too constantly borne in mind. He says: "The common tendency to regard destructive criticism as always easy and generally reprehensible is one I do not share; I doubt if it could be acquiesced in by any sensible person making a frank survey of the intellectual world to-day. At no time in the history of the intellect has the sanitary work of destructive criticism been more needful." If for the words "intellectual" and "intellect" we substitute "medical" and "medicine," these words lose none of their force. Yet if there is nothing the research worker needs more as a stimulus and a guide, there are few things he dislikes more than critical thought applied to his labours. He is always able to persuade himself that any criticism is inept, unnecessary, or impolitic. This, I suppose, will always be so—for the investigator is as full of human frailties as the rest of us; yet this emotional reaction makes all but the most hardy shrink from those periodical and candid surveys of the field of knowledge the lack of which may allow the most fallacious of generalizations to dominate thought for a generation.

Yet it is of the very essence of scientific advance that we should have criticism and synthesis as well as observation. The situation is well summed up by Arnold Toynbee, in respect of history, in the introductory chapter of his *Study of History*. He says: "The three conditions of criticism, transitoriness, and succession under which the scholar has to do his work . . . are conditions that arise from the nature of scholarship itself, which makes its progress by a rhythmic alteration between two activities—the collection of materials and their arrangement, the finding of facts and their interpretation—just as a physical organism lives and grows by an alternating between eating and digestion. The old fable of the belly and its members points the moral that neither activity is superior or inferior, prior or posterior, primary or parasitic, but that each is inseparable from the other as a part of the same whole, and complementary to the other as a phase in the same recurrent process. For the alternation perpetually recurs in virtue of the very nature of thought. When the mind is employed in finding facts, its sheer success inhibits it sooner or later from fact-finding uninterruptedly and *ad infinitum*. Sooner or later it finds itself so formidably beleaguered by the mass of facts which it has gathered round it that, until it has sorted them out and arranged them in some kind of order, it can no longer sally out into the Universe to gather more. Then the mind changes its activity perforce and employs itself for a season in making syntheses and interpretations."

The season of synthesis and interpretation is long overdue in medical science. We have more facts than we can digest—facts enough, indeed, to make salutary advances in ordered knowledge were we given the time and encouragement to make them. Yet the present climate of opinion is adverse to contemplation and the exercise of critical thought, and cries loudly and unthinkingly for ever more facts: the normal rhythm of thought is suspended and we sit bewildered amid the chaos of facts we are not encouraged to put in order.

There is another point about medical research that seems to require a brief reference, and that is the notion, most tenaciously held by those who know least about clinical work, that good research necessarily means work in the laboratory and experiments on animals. This is a crude fallacy; the medical research worker should be the master of all methods necessary to his problems, and the slave of none. He must be ready to extract from each method what it offers, and to choose the combination of methods essential to the successful prosecution of his task. Knowledge will not be advanced by creating a false antithesis between observation at the bedside and the study of the human subject by whatever means are legitimate and useful, on the one hand, and work in the laboratory and on animals on the other. The observation of human disease has by no means exhausted its resources, and even simple clinical observation may yet provide valuable and

essential lines of attack on problems of disease, that cannot perhaps be solved without the additional aid of the laboratory and animal experiment. I cannot believe that any medical research worker can afford to divorce himself from clinical studies. When he does so he invariably loses touch with reality.

External Dangers

If the shortcomings of much medical research that I have indicated really obtain, they are such as can be remedied only by those engaged in that research. Yet there are external dangers that increasingly surround research as it becomes progressively more organized from without by controlling bodies whose paid workers the researchers are. I have ventured to suggest that many more such workers are ready to make observations or experiments than appreciate the necessity for continued thought about their work and its implications. This tendency is not checked when research organizations expect their workers to manifest productivity in terms of published papers. The man who has every year to draw up his annual report showing what he has accomplished can scarcely be blamed if he does not spend much time in contemplation. He will not care to report that he has as yet published nothing, is not ready to publish anything, and has not got very much further than surveying his problem.

Some sacrifices of independence and freedom have to be made when research is widely organized and research workers are paid salaries. Even research foundations have to satisfy their "public" that they are getting results; they have to do some window-dressing. Only an informed and enlightened control can secure for the research worker that freedom from which alone his best work can flow. He must have time to think, and be encouraged to do so, and he must not be haunted by the fear that his productivity is being measured in terms of papers or that his share of the organization's financial resources is grudged him. Under the experienced and sympathetic administration of the more important research foundations he is least likely to suffer in this way, but if and when the State or public bodies—through hospital and other services—take a hand in the matter, and if considerations of political expediency begin to appear, the salaried research worker may end by becoming a kind of scientific helot from whom quick results, in directions not always determined by him, are looked for. Now is the time to safeguard him from this melancholy fate.

One last danger should, it seems to me, be foreseen in the organization of medical research in the new order—namely, the danger that the worker in pure research may be segregated in central institutes remote from hospitals and medical schools. I believe this would be fatal to true progress in medicine. It would take the spirit and the inspiration of inquiry from the schools, wherein alone are to be found the recruits to the ranks of original investigators. It would deprive the student of contact with the research worker, and would deaden the quality of the endeavour of everyone concerned in hospital work and medical teaching. The research worker himself would suffer no less from this isolation from the world of medical endeavour, from the true battle-front of medicine. Thus isolated he would soon lose his sense of reality and of proportion. He would cease to have the necessary vivid awareness of the nature and difficulties of medical problems. It has commonly been so in the past.

Conclusion

It is idle to look back, but how enviable in retrospect was the lot of the physician or surgeon of a past generation who engaged in research work to satisfy his own scientific curiosity! He could think at his leisure, could publish his results when these were ripe and at his chosen moment: he was not harassed by the thought that something was expected from him at stated intervals in the calendar, or by the fear that some organization would begin to think that he was not worth his keep as a research worker. It may be true that we can no longer leave the matter of medical research to his amateur care; but will the subsidized research worker, caught up in the machine of organized research, ever savour the true taste of discovery so fully? It is hard to believe that the human contacts the older workers made in the practice of medicine were not at least one source of their inspiration, or that the time they gave to the treatment of the sick was really the waste some modern advocates of reform would have us think. Therefore, while fully recognizing that the times before us demand a more organized research effort than we have had hitherto, we may yet regret the probability that something of what was most favourable to the best work may be lost in the process, and we may hope that those who are reorganizing the fabric of British medicine will bear all this in mind and will make the conditions under which the salaried research worker has to labour and live most favourable to the free and unhampered development of his powers.

THE PATHOLOGY OF CLOSED INJURIES OF THE CHEST*

BY

J. V. WILSON, M.D.

Major, R.A.M.C.; D.A.D.P. of a Command

After two years of continuous war work I shall here attempt to review in broad detail some experiences gained in the routine post-mortem examination of battle casualties, selecting for special analysis thoracic injuries of the closed type. My material has been drawn from both Service and civilian casualties, and it can be claimed to be wide and varied.

By a closed injury to the chest I mean either that the skin and subcutaneous tissue were intact or that, if these were pierced, the course of the missile had been such as to leave the pleura intact and so the pleural space had no contact with the outside air. This study excludes all cases in which a foreign body had entered the pleura or thoracic viscera, and deals with a group of cases that, to my mind, are the most interesting and in some ways the most important of war injuries. The cases may be divided into two main categories—those due to direct violence to the chest and those in which the injury to the thoracic viscera is indirect—i.e., a result of injury elsewhere in the body. Fat embolism is an example of this latter group: here the lung changes are very definite, but are usually the result of injury elsewhere, such as fracture of long bones. The former group includes: (*a*) lacerations, (*b*) contusions, (*c*) blast injuries (pulmonary concussion); it is principally with these cases that I shall deal.

Lacerations

Laceration of the heart or great vessels is of little pathological interest. It rarely if ever occurs in closed chest injuries, and when it results in rupture is rapidly fatal. A case of ruptured aorta due to blast has recently been reported by Wilson and Tunbridge, but I have not seen any further case of laceration of heart or large vessels in my series of war injuries. Laceration of the lung, on the other hand, is of great importance, and has occurred in this series with considerable frequency.

Case 1.—A gunner aged 28 was admitted suffering from shock and complaining of pain in the right chest. A bomb had exploded near his gun position and he had been thrown up against part of the gun. It was not clear whether he had been actually struck by a bomb splinter: the only evidence of external violence was a cut on the forehead about 2 in. long just to the right of the midline and extending upwards from the root of the nose. He was tender all over his right chest and blood was present in the right pleural cavity. Radiographs revealed multiple fractures of the ribs and a large right-sided pleural effusion. He died about six hours after admission.

At the post-mortem examination there was no evidence of external injury to the chest. The 3rd to 10th ribs on the right side were fractured just beyond the neck, while the 6th, 7th, and 8th ribs were also fractured in the mid-axillary line. The right pleural space contained about 1,000 c.cm. of fluid blood and a small blood clot. The right lung was lacerated by the fractured ribs along the line of the angle of the ribs, there were multiple areas of haemorrhage all over its substance, and it was partially collapsed, a deposit of fibrin being present on the diaphragmatic surface and the lower half of the lower lobe. The left pleural space was intact but contained a small excess of serous fluid, the lung itself being congested but with no definite localized areas of haemorrhage. The gunner had been standing about 40 yards away when the bomb

* The opening address at a B.M.A. meeting (Over-seas Branch), April 30, 1942.

exploded, and most of his injuries would appear to have been due to direct violence, either from a flat bomb splinter or from being thrown against a solid object.

Case 2.—An officer was working with a party of men on an aerodrome when a bomb exploded 150 ft. away. He was hit on the right side by a flat piece of bomb splinter and thrown to the ground. There were no external injuries except bruising of the right upper arm and right chest wall. On admission he was shocked and collapsed, and died about an hour later.

Necropsy revealed no external injury to the chest wall, but there was considerable bruising of and haemorrhage into the muscles of the right chest wall, especially posteriorly. The 4th, 5th, and 6th ribs had been fractured posteriorly along the angle of the ribs and again in the anterior axillary line. They had been driven in, rupturing the parietal pleura and intercostal vessels. The right pleural space contained a small amount of air and 4,000 c.cm. of fluid blood—i.e., a pneumohaemothorax had developed. There was no collapse of the right lung, but the mediastinum had been pushed across to the left side. The right lung was the seat of a large haemorrhage which involved the lower half of the upper lobe, the middle and lower lobes except their anterior margin, and extended throughout the substance of the lung. Three large subpleural bullae were present—one on the anterior aspect of the lower part of the upper lobe, one in the interlobar surface of the middle lobe, and a third, which had ruptured, on the posterior aspect of the lower lobe. This lung had been torn superficially on the posterior aspect opposite the angles of the broken 4th, 5th, and 6th ribs. The left lung was congested throughout and there was a haemorrhagic area in the posterior portion of the lower lobe, involving the deeper portions as well as the subpleural area.

These cases illustrate the chief features of lung laceration in closed chest injuries, and it will be realized that their seriousness depends not so much on the actual lung injury as on the development of complications. Laceration of the lung is rarely severe and seldom causes death in itself: a haematoma forms round the actual tear, but, owing to collapse of the lung tissue, haemorrhage soon stops. The neighbouring lung shows congestion, but there is seldom any evidence of gangrene of the torn edges, since the blood supply is so generous.

Complications

The complications which occur and which may prove so dangerous may be grouped as follows: (1) pneumohaemothorax; (2) compression or collapse of lung; (3) infection.

1. *Pneumohaemothorax.*—The degree of pneumothorax present is as a rule very slight. The clot which forms usually seals off the alveoli, and collapse of the surrounding lung helps this process, so that the amount of escaping air is small and would appear to be quickly absorbed. Subpleural bullae are rarely extensive and seldom rupture. It is true that the nature of the lung injury may be such that a valve may be formed and in this way a tension pneumothorax may develop, but in my experience this is extremely rare. Haemothorax, on the other hand, is common, and may be very extensive. There are two possible sources of origin for blood in the pleural space; it may result from:

(*a*) Bleeding from the intercostal and mammary vessels, which, being systemic, may be very profuse and difficult to stop. (*b*) Bleeding from the pulmonary vessels at the site of laceration. This is rarely severe or fatal in itself. The pressure in the pulmonary vessels is low, the mean arterial pressure in the pulmonary circuit being about one-sixth that of the mean arterial pressure in the aorta, while the pressure in the pulmonary veins is near the zero level. The surrounding lung tends to collapse and the diaphragm on the injured side rises, so that Nature can in most cases be left to deal with this type of bleeding.

The differentiation of these two varieties of injury is important from the point of view of lung surgery.

The pleura is a mesothelial structure and reacts to haemorrhage as if it were a foreign body—i.e., with a mild inflammatory type of reaction. Locally there is an outpouring into the pleural space of a fluid rich in protein, accompanied by fever that is constant and without any evidence of toxaemia and so differs from the swinging temperature in the toxic patient with empyema. The local exudate of fluid not only increases the volume of the haemothorax present but may also cause a mild dehydration, which must be considered in treatment. Its presence and extent can be gauged fairly accurately by comparing the haemoglobin content of the pleural fluid with that of the patient's blood. An interesting fact about haemothorax is that the blood seldom clots to any great extent. A small clot may be present, but the bulk of the blood is still fluid. This may result from either of two factors—it may be due to the fact that there is little tissue destruction and so thrombokinase is absent and hence clotting is greatly delayed, takes place only partially, or does not occur at all; or it may be that clotting does not take place because, by the action of the lung in expanding and contracting, the blood is defibrinated and so in effect cannot clot. From examinations of large numbers of cases it would appear that no single hypothesis can fit every case; but studies of the calcium content and the clotting and prothrombin times of the blood from the haemothorax show that both the above factors play a part, and which of them predominates would seem to depend on the nature of the injury. Often tissue destruction (as in the cases cited) is considerable, ribs may be fractured, and the muscles and the parietal pleura torn, yet the blood may be still fluid. Fibrin in large amounts may be present on the lung surface, and thus defibrination may have taken place. In other cases the tissue destruction may be small and the absence of thrombokinase may be the deciding influence.

It has been stated that the fibrin deposited on the pleura may organize and so prevent the lung re-expanding. This would seem possible in cases in which lung collapse is of some duration, but I have never met with it in this series.

2. *Compression or Collapse of Lung.*—Compression of the lung may be acute as in pneumothorax or may come on gradually as in haemothorax. These cases of haemothorax may not reach clinical significance until 12 to 18 hours, but may finally attain enormous proportions, even as much as 3,000 to 5,000 c.cm. Here the heart is pushed over to the opposite side and the circulation and aeration of the opposite lung are severely impaired. Massive collapse is a rare occurrence; but its possibility should be kept in mind, as early diagnosis is of importance. It would appear to be due to loss of the cough reflex by shock or pain, so allowing mucus to collect and finally block a bronchus, or else a blood clot may find its way from the site of lung injury and likewise cause blockage. When this type of collapse is only temporary no definite pathology may be found in the lungs and complete recovery may take place, but infection or even bronchiectasis is always a possibility if the condition is of any standing.

3. *Infection.*—Even with the introduction of the sulphonamides infection is still the dread of the lung surgeon. In closed injuries of the chest it is rare for the pleura to be infected until later in the course, but pneumonic changes may set in early. They have no special pathological features.

Contusions

This group comprises injuries due to direct violence; these occur chiefly in younger persons whose ribs are still elastic, and so the underlying structures, heart, and lungs can be contused without actual external injury or fracture of the ribs themselves. I also place in this category an indefinite type of lung injury with an intact thorax which has been reviewed by Fallon (1940). He described the case of a medical student who was knocked down when boxing and later developed a cavity in the left lower lobe with a fluid level, a condition which resolved spontaneously and resulted in full recovery. Here the pathology is indefinite, but in this series of war injuries the basic lesion is more easily recognized.

(*a*) Cardiac Contusion

That there can be contusion of the myocardium without any evidence of external injury or fracture of the ribs or sternum has been known for some time, and Barber (1938, 1940) has reviewed the effects of trauma on the heart and discussed the significance of myocardial contusion. He concludes that, while it is a definite pathological entity, the clinical diagnosis is difficult and "more cases of heart disability following trauma are overlooked than are diagnosed by mistake." Anderson (1940) has reviewed the literature on non-penetrating injuries to the heart and reported a new case. He states that injuries to the heart by non-penetrating blows are commoner than has been supposed, and

discusses the pathological and clinical picture. Warburg (1938), in his classical monograph, reviews 202 cases of traumatic injury to the heart. Bright and Beck (1935) have also contributed to the literature, while Moritz and Atkins (1938) have made an interesting experimental and pathological study of cardiac contusion. The importance of the subject is thus now generally recognized, and in all cases in which the history may point to injury to the chest wall evidence of cardiac trauma should be sought for clinically and the possibility of a cardiac element in the general picture eliminated. The whole condition may of course be subclinical, and complete recovery may take place. When it is at all severe we get evidence of myocardial damage such as cardiac irregularities or the development of angina pectoris, valvular lesions, or pericarditis.

In my war experience traumatic cardiac lesions have occurred in two definite circumstances—either from direct trauma to the chest or as a feature of blast injury. Owing to the nature of blast and the difficulty of getting an accurate story of the complete incident it is often impossible, when a bomb explodes, to say that the victim is not either hit directly or thrown against a firm structure, suffering direct violence to the chest. Since the difficulty of differentiating the cause exists, and since the subsequent pathological picture of the cardiac lesion is similar, I shall deal with both groups together. Trauma of the heart may cause contusion of the myocardium, traumatic pericarditis, or rupture of the valves and great vessels. Those subjected to war injuries are as a rule healthy persons, and so previous cardiac lesions do not complicate the picture.

Myocardial Contusion.—If we examine a transverse section of the thorax and note the position of the heart in relation to the spinal column behind and the sternum in front we can see how it is possible, especially in young subjects with elastic ribs, for the heart to be damaged without injury to the chest wall itself. Any part of the myocardium may be involved, but it would seem that the anterior surface of the ventricles was most often affected. At necropsy the pericardial fluid may be blood-stained and increased in amount. The myocardium at the site of contusion is dark and haemorrhagic, and has a naked-eye appearance not unlike an infarct. Microscopically, in recent cases there are subpericardial haemorrhages and evidence of tissue disorganization and generalized congestion. If the lesion is extensive and involves a considerable thickness of muscle the softening which occurs before organization may be serious enough to cause rupture of the myocardium as in the case reported by Priest in 1939. Older cases in which organization has taken place are particularly difficult to differentiate from an infarct. The history, the site of the lesion, and the state of the coronary vessels must be taken into account.

Pericarditis.—Traumatic pericarditis is rarely serious, though Warburg (1938) found a purulent pericarditis in five cases of his series, and described a case of Pick's disease occurring two years after an injury. As most of our cases of cardiac injury due either to direct violence or to blast resulted in death soon after the injury, pericarditis was not seen.

Valvular Lesions and Rupture of Great Vessels.—Kahn and Kahn (1928) have shown, by striking the chest of a corpse, that it is possible to rupture a valve and, though I have never actually succeeded in doing this, several workers have recorded similar results. Moritz and Atkins (1938) in their experimental work report no rupture of valves in any of the 32 dogs whose hearts were subjected to trauma. Elsewhere I have recorded a case of ruptured aorta and tearing of an aortic cusp as a result of blast, but this lesion would appear to be rare.

(*b*) Pulmonary Contusion

In these days of blast, when the proper interpretation of the lesions incidental to bomb explosions is so essential, cases of pure pulmonary contusion are very important, and so a description of one may be of interest.

A soldier aged 26 was admitted to hospital, having been shot through the left shoulder with a rifle bullet fired at a distance of approximately 20 yards. The bullet passed over the neck of the humerus, hit the clavicle, fracturing it in several places, and had apparently been deflected up into the neck, passing behind the cervical vertebrae and emerging from the neck posteriorly on the right side. The patient died 6 hours later owing to shock and haemorrhage from the neck wound. The upper four ribs had been driven in without being fractured, and at necropsy the apex of the left upper lobe was contused, the pleura being intact. There was about 100 c.cm. of blood-stained fluid in the left pleural space. The left lung was congested throughout and the apex was the seat of a large area of haemorrhage situated on the lateral and anterior surface—e.g., peripheral rather than central. Anteriorly its border was very irregular and showed linear markings corresponding to the 2nd and 3rd ribs. The right lung was also congested throughout, but no definite areas of haemorrhage were present. There were also suggestions of linear markings on this side.

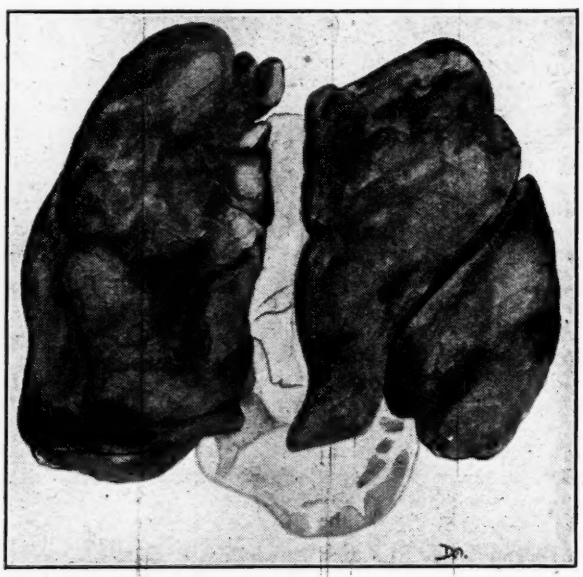
Histological examination of the left apex (the site of the contusion) showed alveoli packed with red blood cells. The capillaries were congested and a few were ruptured. The alveoli were intact and there was no evidence of oedema. The main feature of the left lower lobe was slight generalized congestion, but the whole of the right lung showed scattered areas of haemorrhages into the alveoli and generalized capillary congestion. Slight oedema was present and some of the alveoli were ruptured.

The interpretation of this case would seem to be that direct trauma affected the left upper lobe, causing haemorrhage throughout that lobe. The left lower lobe apparently escaped, but the right lung suffered contrecoup injuries, which produced naked-eye and microscopical pictures identical with those found in pulmonary concussion. It would thus appear that direct injury can produce all the essentials of a blast injury—an observation the importance of which will be discussed later.

Blast Injuries

Blast injuries, especially as they affect the lung (pulmonary concussion), have provided one of the most interesting studies in this Command during the present war. The weight of the aerial attack and the structure of many of the shelters made its incidence high. I have had the opportunity of examining a number of large and small series of cases, as well as many individual ones, and so have been able to get some idea of their basic pathology and usual clinical course.

In blast the lung picture is usually one of haemorrhage. These areas of haemorrhage are scattered throughout the whole of the organ, and are found deep in the lung substance as well as being subpleural. There is no suggestion of consolidation, and the general feel of the lung is rubbery. Dark linear markings are present in adults just as often as in children, and from a study of the lung position in some of our later cases I



Typical appearance of a lung in cases of blast injury. Note the general congestion, with darker areas of haemorrhage. On the right lung these darker areas are located along the interlobar septa, and on the left they have taken on a linear distribution.

regard these, especially in older people, as corresponding to intercostal spaces rather than to ribs. Apart from these intercostal markings there is no special predilection for the areas of severe haemorrhage, but as a rule the regions most affected are those parts of the lung which expand indirectly—i.e., the posterior surface of the lung apex and the posterior surfaces of the lungs

in contact with the spinal column and attached segments of the ribs—and laterally the maximum effect is in the middle parts—i.e., opposite the 5th, 6th, and 7th ribs (as shown in the accompanying illustration). The picture is bilateral, though one lung may be affected more than the other. However, there is no general rule as to the position of the body in relation to the source of blast and the severity of the haemorrhage, since other factors operate. Apart from this picture of haemorrhage and emphysema the only other naked-eye appearance of significance is the presence of subpleural bullae. These occur in only a small proportion of cases, but are very definite. The pleural spaces usually contain blood-stained fluid.

The histological picture of those dying early is what one would expect from the macroscopic appearance. There is widespread congestion, often with intra-alveolar haemorrhage to a very marked extent. The alveoli may be ruptured and mild oedema may be present even in the early stages. There is no definite relation between the size of the haemorrhages and the survival period, but most of the bleeding would appear to take place almost at once. Later, fibrin formation and round-cell infiltration occur.

The after-course of these cases is gradually becoming clearer. That many are mild enough to be subclinical throughout their whole course is apparent from post-mortem studies of patients subjected to blast and dying later of a complicating lesion. The incidence of blast lesions of a minor degree among air-raid casualties would appear to be high. They seem to clear up in time with little symptomatology and no sequelae. The clinical cases pass through a stage of bleeding which is probably quite short (4 to 6 hours), then a stage of coagulation, absorption, and repair somewhat as occurs with a pneumonic exudate. Patients who die do so as a rule because of injuries elsewhere, but those subjected to pure blast seem either to die in the first few hours or to recover if no complication sets in. The course of these cases, however, is beset with three dangers: (1) development of pneumothorax; (2) acute oedema and heart failure; (3) infection—bronchopneumonia.

One of my patients developed a pneumothorax shortly after admission to hospital and died within 24 hours. A subpleural bulla which had ruptured was present on the surface of the right lower lobe. The histological picture of the lungs was characteristic of blast injury. He had received no direct chest injury. Cases such as the one described below would appear to be those most liable to develop acute oedema and heart failure.

A man aged 24 was standing at the entrance of a shelter when a bomb exploded 20 ft. away. The blast was considerable and a bomb splinter injured his foot. On admission to hospital he had lost a considerable amount of blood, was shocked, and as amputation of his foot was necessary a transfusion of whole blood was given. He died next day with clinical signs of right-sided heart failure. At necropsy were found dilatation of the heart and extensive pulmonary oedema superimposed on blast changes—a condition confirmed by histological examination.

Finally, since we are dealing with a lung which is full of haemorrhagic areas and with a patient whose vitality is lowered by shock and whose treatment demands a certain amount of immobility, we would expect infection to develop. On the whole, however, a pneumonic process was comparatively rare in this series.

An aspect of blast injuries which has received little attention in the literature is the mediastinal changes which occur. I have found contusion of the myocardium in several cases, and, in one, rupture of the aorta, while many have petechial and small haemorrhagic areas in the anterior mediastinum, all pointing to mediastinal trauma. It is important, therefore, for the physician to examine all cases of blast with respect to cardiac symptoms such as tachycardia, dilatation, and cardiac irregularity.

Two Problems of Blast Injuries

In the elucidation of blast injuries two problems present themselves: What is the mechanism of the production of the *lung damage*? and What is the *cause of death*? Two theories can explain the lung injuries—direct trauma to the chest wall, or a force acting down the trachea and bronchi, causing either a negative or a positive pressure wave. Direct trauma would seem to explain the condition much better than any other theory, and, indeed, is probably the only one which at the same time accounts for the lung damage and mediastinal injuries as well as the abdominal lesions found. It is probable that in pulmonary concussion we are not dealing with a new condition but with contusion of the lung caused by a fresh set of circumstances as a result of war. When a bomb explodes, the body is at once placed in a medium of high pressure such as that in which a diver would find himself if unprotected at a depth; and so the abdominal and thoracic cavities, with their relatively weak walls, give way before the external pressure, and the underlying organs are damaged, especially elastic organs such as the lungs.

Four main theories have been advanced as to the cause of death in these cases. First, since the lungs appear to suffer most, many workers have thought that death might be due to the pulmonary haemorrhages and interference with respiratory function. Examination of blast cases shows that, while this might be true in some cases, the lung injury is usually not sufficient to cause death. Secondly, some have postulated a cerebral cause of death. The lesions in the brain in those dying immediately or soon after injury are very indefinite, but if we postulate a wave of positive pressure coming up from the abdomen and thorax via the blood stream and damaging the vital centres no gross pathological change would be expected. Thus, while positive evidence is scanty still, this theory is the most reasonable one yet formulated. Thirdly, death may be cardiac in origin. I have stressed the importance of injury to the heart in cases of blast, and there is quite a chance that ventricular fibrillation may occur and account for death on certain occasions. Fourthly, air embolism may be a possible cause of death. In blast the body is suddenly immersed in a wave of high velocity and pressure, the picture somewhat resembling that of a diver released unprotected at a depth. The gaseous content of blood and tissue fluids may thus be increased even though the effect of the blast wave is momentary. Then, as the effect of the blast wave passes off, the body is faced with an impossible situation, as in the case of a diver immediately brought to the surface, and air embolism is the result.

Pulmonary Fat Embolism

Reported cases of pulmonary fat embolism have rapidly increased in number in recent years owing to wider recognition of the condition. This is usually a sequel to fracture of a long bone, especially the femur, the fat gaining entrance to the blood stream and being carried to the lungs; thence it passes into the general circulation, causing pathological changes in the brain, kidneys, and heart muscle.

In a series of cases reported by Wilson and Salisbury in 1942 the main macroscopic lung findings were haemorrhage and mild oedema. The congestion and haemorrhage may be considerable, but I did not see the large subpleural haemorrhages described by Robb-Smith. These are much more characteristic of pulmonary concussion. Small areas of subpleural haemorrhage may be present. On cutting into the lung surface the picture is one of extreme congestion with small areas of haemorrhage. Microscopically, fat can be demonstrated in fresh preparations by Robb-Smith's technique, though I have found that staining the lung tissue with Wright's stain gives more convincing results. When stained with osmic acid, fat droplets can be seen in the capillaries. The alveoli contain red cells and oedematous fluid, the red cells being much less numerous than in blast cases, but the oedema is usually much more pronounced.

Summary

The main pathological features occurring in closed chest injuries are outlined.

In laceration the chief danger is haemothorax, the pathology of which is here dealt with.

The pathology of pulmonary contusion is compared with the effect of blast, and the evidence for regarding pulmonary concussion as being due to the direct trauma to the chest wall is outlined.

The importance of cardiac lesions in chest injury is stressed.

Lung changes in cases of fat embolism are briefly discussed.

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BIBLIOGRAPHY

Alexander, J. Browning (1940). *Post-grad. med. J.*, **16**, 84.
Anderson, R. G. (1940). *British Medical Journal*, **2**, 307.
Barber, H. (1938). Ibid., **1**, 433.
—— (1940). Ibid., **2**, 520.
Bright, E. F., and Beck, C. S. (1935). *Amer. Heart J.*, **10**, 293.
Edwards, F. R., and Davies, H. Morriston (1940). *Lancet*, **2**, 673.
Fallon, M. (1940). *Brit. J. Surg.*, **28**, 39.
Hadfield, G. (1941). *Proc. roy. Soc. Med.*, **34**, 189.
—— (1941). *Lancet*, **2**, 197.
—— (1941). *British Medical Journal*, **2**, 239.
—— and Christie, R. V. (1941). Ibid., **1**, 77.
—— Ross, J. M., Swain, R. H. A., and Drury-White, J. M. (1940). *Lancet*, **2**, 478.
Kahn, M. H., and Kahn, S. (1928). *Ann. intern. Med.*, **2**, 1013.
Moritz, A. R., and Atkins, J. P. (1938). *Arch. Pathol.*, **25**, 445.
Robb-Smith, A. H. T. (1941). *Lancet*, **1**, 135.
—— (1941). Ibid., **2**, 198.
—— (1941). *British Medical Journal*, **2**, 241.
Ross, Joan M. (1941). Ibid., **1**, 79.
—— (1941). Ibid., **2**, 241.
—— (1941). *Lancet*, **2**, 199.
Scadding, J. G. (1941). *British Medical Journal*, **2**, 57.
Sellors, T. Holmes (1941). Ibid., **1**, 825.
Warburg, E. (1938). *Traumatic Heart Lesions*, Humphrey Milford, London.
Zuckerman, S. (1940). *Lancet*, **2**, 219.
—— (1941). *Proc. roy. Soc. Med.*, **34**, 171.

AN OUTBREAK OF EPIDEMIC CATARRHAL JAUNDICE

BY

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A review of accounts of outbreaks of epidemic catarrhal jaundice occurring in this country shows that the majority have affected rural areas. There have been exceptions, for Morgan and Brown in 1927 described an extensive outbreak in the Midlands in which 200 persons were affected, with one fatality. A previous outbreak in Staffordshire was described by Frazer in 1935, although Barber (1937) regarded this epidemic as one of infective hepatic jaundice. It would appear that the town-dweller has relative immunity from this disease. The following account of an outbreak of epidemic catarrhal jaundice occurring in an urban area may therefore be of some interest; it is published in the hope that other writers may suggest further aetiological factors and effective measures of control.

Incidence

A total of 64 cases occurred in an outbreak which has lasted for eight months. This figure is estimated to represent about 80% of the total number of cases. The outbreak was chiefly among school-children, and the few adults affected were mainly young school-teachers. The epidemic appeared to be confined to one school for several months, but after a summer holiday, during which only a limited number of children attended school, the disease made its appearance at several other schools. Practically all of these schools were in the northern part of the borough.

The seasonal incidence of the disease is usually in autumn and winter, but this epidemic began in the spring and continued over the summer. The sex incidence was about equal. The highest age incidence occurred between 6 and 10 and between 20 and 30 years. It was noted that in no case were more than two members of a family affected. School-teachers were particularly at risk to the disease.

Age	Males	Females
4–5 years inc.	5	3
6–10 „ „	20	22
11–15 „ „	3	3
20–30 „ „	Nil	5 (4 school-teachers)
Over 30 „	1	2 (1 school-teacher)
Total	29	35

Aetiology

The evidence points to a contact at school. The epidemic had not the explosive nature usually associated with outbreaks of food-poisoning due to contaminated food, milk, or water. Further, the water supplies of the borough are chlorinated, and school milk supplies are bacteriologically clean. Again, the infant and junior departments in the school mainly affected received milk supplies from different sources. The disease appeared to pick out the children in twos and threes from each class, and the available evidence pointed to a close personal contact, with droplet infection as the probable means of spread. No bacteriological examinations were carried out, but reports of previous epidemics show that they are negative and that the probable cause of the disease is a filterable and ultramicroscopic virus. There was no particular incidence of sore throats or enteritis. While an epidemic of enteritis occurred in some of the schools of the borough, this was seasonal, and, further, there was no especial incidence of cases of catarrhal jaundice at any of them.

Clinical History

From descriptions given by various medical practitioners, and from visits made to many of the cases, the following clinical report has been compiled.

The spread of the disease suggests that the incubation period varies between three and four weeks. In the prodromal period malaise and anorexia may be present, but more often the disease started with vomiting, sometimes associated with severe upper abdominal pain. The attack of vomiting lasted from a few days up to a week, and resembled cyclical vomiting. Constipation was usual, though a few cases had diarrhoea until the onset of jaundice. In some cases jaundice limited to an icteric tinge of the conjunctiva, and nausea, were the only symptoms, and the illness cleared up in less than a week. With the cessation of vomiting, jaundice appeared first of all in the conjunctiva, and in the course of a day or two spread to the skin of the face, trunk, arms, and lower limbs. The colour deepened to a canary yellow, and the motions became clay-coloured and the urine orange-coloured. Pyrexia was variable in occurrence and in severity. Headache was sometimes severe. There was well-marked enlargement of the liver, with tenderness over the gall-bladder. The spleen was enlarged. The jaundice lasted a variable period from a few days up to two weeks, and gradually disappeared in the reverse order. The faeces and urine became normal a few days before the jaundice disappeared from the skin.

Examination of blood films from five of the cases in the acute stage showed a well-marked leucopenia with a relative lymphocytosis. An increase in monocytes was noted in each film. In the acute stage in adults there was sometimes complaint of severe pains in back, arms, and legs. No epistaxis or petechial rashes occurred. Despite the severe jaundice, itching of the skin was present in very few cases. Convalescence was marked by the development of excessive appetite. In a few instances some degree of furunculosis occurred.

Vomiting in the acute stage is usually a feature; Lisney (1937) attributes this to duodenitis. According to Pickles (1930), the severity of the upper abdominal pain may suggest a perforation.

Differential Diagnosis

The diseases to be excluded are Weil's disease, infective hepatic jaundice, simple catarrhal jaundice, enteric fevers, and acute yellow atrophy. Weil's disease is marked by epistaxis and petechial rashes, with high fever, severe nervous disturbance, blood leucocytosis, and the identification of leptospira in the blood. Infective hepatic jaundice is characterized by an absence of pre-icteric symptoms, and the jaundice is less marked. Simple catarrhal jaundice occurs sporadically. The symptoms are very similar to those of epidemic catarrhal jaundice, and this complaint may be an interepidemic type. Jaundice seldom occurs in the enteric group, while acute yellow atrophy is a very rare disease.

Spread of the Disease

The spread of the outbreak is well illustrated by the experience of the junior department of one of the schools.

Class: Boys aged 7
C. H.—Away Sept. 24
M. R.— „ Oct. 21
Class: Boys aged 10
A. H.—Away May 19
T. W.— „ June 18
Class: Girls aged 9
B. F.—Away July 27
J. M.— „ Sept. 4
M. G.—Oct. 3 (3 days' jaundice; not excluded from school)
Miss S. (teacher of the class)—Away Oct. 10
B. T. (daughter of Miss S.'s landlady)—Away Oct. 29
No cases were reported from B. T.'s school at this time.

The evidence suggests a spread of the disease from child to child and from child to school-teacher, and that very close personal contact was necessary.

It was interesting to note that no member of a class of nursery children, in the charge of a school-teacher suffering from the disease, contracted the illness. It was observed that the incidence in children under school age was low.

Clear cases of infection of two school-teachers who were friends occurred at one school, with an interval of three weeks between the illnesses. No children in their respective classes were affected, although the disease was prevalent in the school. It seems that the infective period is a short one, and Pickles (1939) states that further evidence of this is noted in the periodicity of attacks. A two-weeks isolation period was not followed by any return case.

Conclusions

It appears that epidemic catarrhal jaundice spreads chiefly in school-children, but young school-teachers frequently contract the disease.

There is probably among the general public a lack of appreciation that cases of jaundice occurring in children may be infective.

This disease seems to have a short infective period, to be spread by close personal contact, and to have an incubation period of between three and four weeks.

It is spread through an ultramicroscopic virus, notably by way of the upper respiratory tract. No effective measure of control appears available. School closure leads to scattering of the disease over a wider area.

A period of two weeks' isolation seems to be sufficient. This was carried out in the present outbreak, and there were no return cases.

The town-dweller appears to have little immunity from the disease, which spreads in the same manner as in rural areas. Two age groups are chiefly affected—6 to 10 years and 20 to 30 years. It is possible that the former group is affected because children of this age may be more sociable in their habits.

An epidemic of enteritis may occur coincidently with an epidemic of catarrhal jaundice if either occurs out of season.

I wish to express sincere thanks to Dr. R. H. H. Jolly for permission to carry out this investigation.

References

Barber, H. (1937). *British Medical Journal*, **1**, 67.
Frazer, E. M. R. (1935). Ibid., **1**, 701.
Lisney, A. A. (1937). Ibid., **1**, 703.
Morgan, M. T., and Brown, H. C. (1927). Ministry of Health Report on Public Health and Medical Subjects, No. 42, London.
Pickles, W. N. (1930). *British Medical Journal*, **1**, 944.
—— (1939). *Lancet*, **1**, 893.

PEDICULOSIS CAPITIS AND INTELLIGENCE IN W.A.A.F. RECRUITS

BY

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Recently much interest has been aroused in the question of the correlation of parasitic infestation, particularly scabies, with intelligence. The results so far have been controversial. Hodgson (1941a, 1941b) found that the incidence was higher in men of inferior intelligence, whereas Mellanby *et al.* (1942), attempting to corroborate Hodgson's work, found that men suffering from scabies were mentally an approximately normal sample from the Army.

The Investigation

The opportunity for the present investigation occurred during psychiatric work at a large W.A.A.F. depot when selecting recruits suitable for trade training, those suitable for acceptance in the Service but not for trade training, and those unlikely to become efficient airwomen. Broadly speaking, the problem resolves itself in the main into one of intellectual grading, although obviously other factors, such as personality, temperament, previous work, and social history, enter too. The correlation between parasitic infestation and intelligence therefore has a practical aspect: thus in cases in which doubt occurs, opinion may be, and in fact has been, swayed by the incidence of scabies, pediculosis, or, as sometimes happens, both.

In the W.A.A.F. pediculosis capitis is by far the greatest of all parasitic problems, and because of the relatively large numbers infested the correlation of intelligence and infestation was attempted. All W.A.A.F. recruits on arrival at the depot are examined for pediculosis capitis by specially trained medical orderlies as part of the routine F.F.I. examination. Those found to be infested are detained in "head huts" for treatment, and their intelligence tests, psychiatric examination if necessary, and trade selection are postponed till such treatment is completed.

The intelligence test used on all W.A.A.F. recruits is the "G.V.K." test, devised by Dr. W. Stephenson of Oxford. This consists of three group paper and pencil tests applied by specially trained W.A.A.F. officers and airwomen under standard conditions. They are divided in accordance with the Spearman approach to intelligence into "G" tests (general analytical intelligence), "V" (verbal intelligence), and "K" (practical-mindedness). The raw score on these tests is converted into percentiles expressing in percentage terms the standing of a recruit in relation to other recruits.

Results

The G.V.K. scores expressed in percentiles of 312 recruits after treatment for pediculosis capitis are given in Table I. The percentile G.V.K. scores of 312 unselected recruits found to be free from pediculosis capitis are given in Table II.

TABLE I.—*G.V.K. Scores in Percentiles : Recruits Treated for Pediculosis Capitis*

Percentiles	Number of Recruits		
	G	V	K
90–99	7	6	0
80–90 ..	15	22	0
70–80 ..	26	14	2
60–70 ..	21	15	3
50–60 ..	31	19	8
40–50	28	22	9
30–40	42	31	32
20–30	44	34	47
10–20	41	64	57
0–10	57	85	154
Total	312	312	312

TABLE II.—*G.V.K. Scores in Percentiles : Unselected Recruits free from Pediculosis Capitis*

Percentiles	Number of Recruits		
	G	V	K
90–99	70	53	7
80–90	65	65	17
70–80	44	42	12
60–70	23	19	24
50–60	24	21	33
40–50	25	20	39
30–40	23	27	44
20–30	25	19	51
10–20	8	27	44
0–10	5	19	41
Total	312	312	312

A comparison of the two tables shows very clearly that the number of recruits with the lowest percentile scores is greater in all three tests in those treated for pediculosis capitis. Thus, in G, V, and K there were respectively 212 (69%), 236 (76%), and 299 (96%) with percentile scores of between 0 and 50 in recruits treated for pediculosis capitis, as compared with 86 (28%), 112 (36%), and 219 (71%) in those found on initial F.F.I. examination to be uninfested.

Summary

On initial F.F.I. examination 312 W.A.A.F. recruits found to be infested with pediculosis capitis were treated and then given the Stephenson G.V.K. intelligence tests. The scores after

conversion into percentiles were compared with the percentile scores of 312 unselected recruits who were uninfested.

There was a marked difference in the scores of the two groups, the lowest scores in all three tests being found in the infested group, suggesting that pediculosis capitis is more prevalent among the less intelligent recruits.

I wish to thank A.S.O. Comley, W.A.A.F., and Corporal (now Sergeant) Minnitt, W.A.A.F., for their very valuable assistance.

REFERENCES

Hodgson, G. A. (1941a). *British Medical Journal*, **1**, 316.
—— (1941b). *Lancet*, **2**, 791.
Mellanby, K., *et al.* (1942). Ibid., **2**, 596.

TREATMENT OF MALARIA IN ENGLAND

BY

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The manifestations of malaria as seen in England are almost protean in appearance and character, so it is probable that many cases are overlooked. In particular this is true of the subtertian, in which the classical periodicity is not always to be found and which may indeed show no fever. Most of the cases seen in England are probably examples of relapse, because patients generally have resorted to some antimalarial drug with the onset of the primary fever in the Tropics. Frequently, however, the dosage which they use is so inadequate that return to a colder climate precipitates an attack.

During a period of a little more than 18 months there have come under observation and treatment at the Seamen's Hospital 60 cases of malaria in which the diagnosis has been confirmed by finding parasites in blood films. The numbers may appear trifling to those who are accustomed to this infection in regions where it is indigenous, but to English practitioners they may seem formidable. In the course of diagnosis and treatment some problems have appeared, but with few exceptions it has proved possible to adhere to a standardized procedure. Certain variations, both in the nature and in the length of treatment, have been unavoidable as a result of exigencies of war, but the main therapeutic scheme has been similar in 57 cases of subtertian malaria. The overwhelming preponderance of subtertian infection was natural, since most of the patients had been infected in Freetown, Sierra Leone, where other species of malaria are almost unknown. In 40 a history of previous quinine therapy was obtained, but, as many of the patients were foreigners and the language difficulty sometimes did not permit of an accurate and detailed statement, it was not always possible to find out whether quinine had been taken prophylactically or therapeutically. Previous quinine therapy had undoubtedly modified the clinical picture very greatly and increased the difficulties of diagnosis. One patient at least, dissatisfied with delay while the diagnosis was being established, continued to take quinine surreptitiously while in hospital, thus rendering the difficulty even greater.

Diagnosis

Throughout the period under review it has been considered essential to demonstrate malaria parasites in the blood film before starting specific therapy, but in order not to overburden the pathological service an attempt has always been made to establish a clinical probability before calling in laboratory aid. Of the patients 44 had fever at the time of admission, while 24 complained either of shivering attacks or of malaria, and in these cases the probability was considered to be sufficiently great to justify blood examination; but during the same period more than 40 men were admitted diagnosed wrongly as cases of malaria either on their own initiative or by the masters of their ships, and among the various causes of symptoms "influenza," bronchitis, cystitis, and tuberculosis were found to be the most important in order of frequency. Any patient who develops a fever after recently returning from the Tropics is, of course, to be suspected of malaria, but it is just as important to recognize the multitude of other febrile conditions which *may* be present as it is to diagnose malaria correctly when it is present. In any suspicious case blood films must be examined on more than one occasion, and the blood should preferably be taken when the fever is at its highest. The use of a preliminary injection of adrenaline half an hour before the taking of blood films is referred to later. The character of the fever was not found very helpful, and only two cases remained undiagnosed for long enough to reveal tertian periodicity.

Among the more baffling symptoms generalized aching pain in the limbs was described in 4 cases, abdominal symptoms in 3—one of which cases was admitted as an acute abdominal emergency and one on account of bloody diarrhoea—and 10 gave headache as their main complaint. One patient was admitted unconscious, with high fever. Cerebral malaria was promptly diagnosed, since it is an established custom to regard all pyrexial comatose patients as suffering from malaria until some alternative diagnosis is established. In 43 the spleen was palpable, but in only 5 was more than a 2-finger enlargement recorded, while in a certain number of cases the organ could be felt only by deep subcostal palpation with the patient lying on his right side. Considerable practice is necessary to detect lesser degrees of splenic enlargement, and it is slight splenomegaly which is most likely to help in diagnosis of doubtful cases. Anaemia of varying degree was present in almost every case, but haemoglobin estimations were made only in those cases in which, on clinical grounds, a severe depression was anticipated. Out of 22 cases in which the haemoglobin was determined 17 gave values below 70%.

The blood examinations for parasites were carried out by Dr. Arthur Davies; he recorded malignant tertian rings alone in 39 cases, rings and crescents in 13, and crescents only in 5 cases. Benign tertian parasites were found in 2 cases and quartan malaria in a single instance. One of the benign tertian patients had apparently been infected either in South America or in Panama, while the other had spent some years in India although he had been for a few weeks in Freetown also. The quartan infection apparently originated in the Philippines. Out of 60 cases in the series, parasites were found at the first examination in 42 and at the second examination in 13, while in the remainder multiple examinations were necessary. In 2 cases parasites were discovered only in films taken after the injection of adrenaline, given as a simple subcutaneous injection, usually before the second examination. The intravenous technique of Ascoli was not employed.

Treatment

The benign tertian and quartan infections were treated with quinine only. The subtertian infections were treated with a combination of mepacrine (atebrin) and quinine, pamaquin (plasmoquine) being given subsequently to those patients in whom the sexual forms of the parasite had been found. In all cases two equal courses of mepacrine 0.1 g. t.d.s. combined with quinine in varying dosage were given, while in the intervening period quinine alone was used. The original course lasted 15 days, but later the course was extended to 21 days: throughout the series, however, it was divided into three equal periods—two of mepacrine and quinine together and one of quinine alone. In the original course quinine 10 gr. t.d.s. was given, but this was subsequently reduced to 5 gr. b.d. without any adverse effect on the therapeutic result being noted. The total dosage now given in 21 days is 4.2 g. of mepacrine and 210 gr. of quinine. The course is therefore now as follows:

First week: Mepacrine 0.1 g. t.d.s.; quinine 5 gr. b.d.
Second week: Quinine 5 gr. b.d.
Third week: Mepacrine 0.1 g. t.d.s.; quinine 5 gr. b.d.

After completion of the above course pamaquin was added in cases in which crescents were present.

The considerable total dosage of drugs was regarded as justified when treating patients in England, where there is no danger of reinfection and where the number under treatment is inevitably so small. No case of quinine sensitivity was encountered, and only 4 developed yellow mepacrine pigmentation. Of these, 3 were but slightly tinged; but the fourth patient, who had been certified as fit for duty, was sent back with a pointed letter about the fitness of "jaundiced" patients.

Fortunately, mepacrine pigmentation scarcely ever tints the conjunctivae, so that differential diagnosis is easy.

The dosage of pamaquin was 0.01 g. t.d.s. for 3 to 5 days. It was given alone subsequent to the routine course. All patients received adequate therapeutic doses of iron.

In a few who were seriously ill on admission, including the cerebral malaria case, intramuscular quinine was injected with dramatic results, but it was never necessary to give more than two doses. The injections are painful and may give rise to necrosis, but they are not often necessary in this country. Since this series was concluded a trial has been made of an almost painless quinine solution, but its therapeutic activity seems to be far below that of the oral course which has here been described.

Results

The clinical results have been most gratifying and there have been no deaths in the series. All the patients were in good health when discharged, none has returned with a recurrence, and we have had no inquiries from other hospitals for clinical notes of these patients. However, sailors are nomadic persons, and it may well be that relapses have indeed occurred.

In the 44 patients who had fever on admission defervescence occurred on an average less than 24 hours from starting treatment, and the longest time fever persisted was 72 hours, in two cases only. The average stay in hospital was 27 days, but in most cases a part of this time was spent at our convalescent home, and some of the patients required treatment for other conditions. If the length of detention should require further justification, it may be found in the imperative need to restore seamen to complete health before permitting them to return to their arduous duties, and, finally, in the need to restore their haemoglobin to normal level.

Summary

A series of 60 cases of malaria, of which 57 were subtertian, is described.

Clinical examination has shown that neither fever nor splenomegaly can always be relied upon to suggest diagnosis, but anaemia is generally present.

A course of treatment combining mepacrine and quinine was found satisfactory.

The results of treatment were uniformly good, but no extensive follow-up was possible.

My thanks are due to Sir Philip Manson-Bahr and to Dr. Arthur Davies for their constant help and advice.

Medical Memoranda

A Case of Extreme Exomphalos

Exomphalos is a well-recognized congenital malformation which is said to occur once in every 6,000 births. It is due to the non-closure of the abdominal wall, presenting a picture which, normal in early development, has persisted to term. The case described is one in which the defect was carried to the extreme.

Case History

Mrs. A., aged 20, a primipara, was admitted to hospital in labour. Medical assistance was sought on account of a loop of intestine being delivered with the shoulders. This belonged to the foetus (not to the mother, as the midwife at first thought). Delivery was completed. The child, a female, was in good condition apart from a mass consisting of coils of intestine lying on the abdominal wall. This mass was gangrenous and distended. Removal was the only course open.

Operation was performed an hour after delivery. The object of the laparotomy was to remove the dead tissue and to see the exact nature of the lesion. No anaesthetic was given, and a right paramedian incision was made. The gut appeared alongside the umbilical cord, on the inferior aspect; the latter was normal. The exit was small, approximately an inch across, and the parietal peritoneum ended at the edges of the opening. At the upper end viable intestine was found at the end of the second part of the duodenum, and at the lower end the pelvic colon. At each end the gut was divided and a small tube ligatured in and brought out through the abdominal wound. Apart from a large liver no other abnormalities were seen. During the operation the child did not give any cause for anxiety. It lived for six days, at the end of which death occurred from peritonitis. No other congenital defects were found at the necropsy.

The Specimen.—This consisted entirely of intestine. It began at the third part of the duodenum and ended at the beginning of the pelvic colon.

Small Intestine.—The upper part was discoloured small intestine surrounded by a mass of myxomatous tissue. The mesentery was twisted on its axis, forming a volvulus: from the appearance of the gut it was a recent development, but was not considered viable. Below this the ileum was lost in the large intestine and was found to be an intussusception of the ileo-caecal variety. This was reduced with difficulty.

Large Intestine.—This was very dilated and the taeniae coli were not evident. The contents were fluid and contained much vernix caseosa. The mesentery was very thick, consisting of myxomatous tissue. At the lower end there was a constriction where it was obstructed at the exit from the abdomen.

The intestine thus presented a picture of obstruction of the large bowel with an intussusception and volvulus of the small bowel.

Comment

It is considered that the foetus *in utero* had a marked exomphalos containing the major part of the bowel. During the descent in the second stage of labour, lasting four hours, the peritoneal covering was torn off and the large bowel was compressed between the uterus and the foetal abdominal wall, obstructing the blood supply. Ensuing peristalsis resulted in the intussusception. The volvulus, as mentioned, was recent, and was formed towards the end of the second stage of labour.

There has been much discussion as to the absorption of glucose from the stomach. In this case part of the duodenum was present, but it was considered worth while to investigate the blood sugar after a known dose of glucose. 10 g. of glucose was given by mouth, and the blood sugar was estimated at half-hour intervals, the blood being taken from the anterior fontanelle. The result showed a curve which approximated to the normal adult curve, though the basic level was very low; the fasting level was 44 mg. per 100 c.cm. Considering that the child lived for six days on glucose given by mouth, good evidence is afforded that glucose is absorbed from the stomach and upper duodenum.

I wish to express my thanks to Dr. Daley, Medical Officer of Health, County Hall, for permission to publish this case; to Dr. E. Moore, obstetrician, Lambeth Hospital, for calling me to see the case; and to Dr. R. F. L. Hewlett, group pathologist, Lambeth Hospital, for the blood-sugar estimations.

Lambeth Hospital. R. F. HENDTLASS, M.R.C.S.

Interstitial Emphysema during Labour

The following case is reported in view of its unusual character and rarity.

A primipara aged 17 was admitted to hospital in the early stages of labour and suffering from acute nasal catarrh with severe bronchial cough. Her previous medical history was good, with the exception of her grandfather, who had died of pulmonary tuberculosis, and her father, who had died at the age of 38 from meningitis. Labour started at 2 a.m. on Oct. 13; the membranes ruptured at 11.35 a.m. on the same day, and there was full dilatation of the cervix at 11.15 p.m. The second stage was characterized by really severe pains. The baby was born at 1 a.m. on Oct. 4.

At 12 midnight, one hour before the baby's birth, it was noted that the right side of the mother's face was rapidly swelling, and she complained of stiffness on that side of the neck. Within a quarter of an hour the face was completely unrecognizable: the eyes were quite closed and the cheeks had merged flush with the nose, and the lips were so swollen that the patient had difficulty in speaking. The swelling involved the head, including the crown of the scalp, the neck, and the upper part of the chest; in diminishing severity it also involved the whole area back and front of the chest down to the costal margins. The diagnosis of interstitial emphysema was made, all areas emitting the characteristic crackling crepitus and the skin giving the resonance to light finger-tapping similar to that of the surface of a sorbo ball. The pelvic measurements were not unduly small, and the baby at birth weighed 7 lb. 8 oz. The total length of labour was 23 hours 10 minutes. On clinical examination no chest lesion could be detected, neither could the patient recollect any special sensation in her chest before the onset of emphysema. An *x*-ray examination of the pulmonary fields was negative and the blood sedimentation rate normal. One week after labour the greater part of the swelling had subsided and the only crepitus that could be elicited was situated over the upper part of the chest on each side of the sternum. The puerperium was uninterrupted, and at no time did the patient appear to be affected by her condition.

ROGER STANLEY.

E. E. Katwinkel (*New Engl. J. Med.*, 1942, **226**, 419) records a case of typhoid fever in a woman, aged 59, in whom sulphathiazole and sulphanilamide in no way influenced the course of the disease and failed to clear the stools of *Bact. typhosum*. The stools, however, became and remained negative after eight days of intense sulphaguanidine treatment.

Reviews

ANATOMY OF THE CENTRAL NERVOUS SYSTEM

Neuro-Anatomy. By Walter R. Spofford, B.S., Ph.D. Oxford Medical Outline Series. (Pp. 110. 12s. 6d.) London, New York, Toronto: Oxford University Press.

That there is a demand for books dealing in detail with the complicated anatomy of the central nervous system is evidenced by the appearance of two volumes of very different character, published within the last year and bearing the same title, *Neuro-Anatomy*. One of these, a large work by F. A. Mettler, superbly illustrated, and concerned with the topography and microscopic anatomy of the nervous system, was reviewed in these columns on Aug. 29 last (p. 246); and the other now appears as one of the Oxford Medical Outline Series. This has been written by Dr. W. R. Spofford with a view to aiding students who are starting the study of this subject and also to assisting both students and practising physicians to extract from the "vast array of factual data" the fundamental principles underlying the structure of the central nervous system. The author has certainly succeeded in bringing together in a concise form the more essential details of the various tracts and nuclei of the central nervous system, and provision has been made for supplementary notes or drawings by the insertion of blank pages alternately with the text pages. The value of the book, which is wholly lacking in illustrations, would, however, be more than doubled if carefully labelled outline drawings were supplied, so as to enable the beginner to visualize the various centres and nerve tracts in their relation to one another. On the whole the volume is an accurate statement of the accepted facts of neuro-anatomy, but there are some mistakes which require correction, more especially in the spelling of certain proper names (pp. 19, 20, 47) and in the description of the intrapontine course of the fibres of the facial nerve. Except for these minor defects, which can be remedied, the work in its present form will be of value in revising earlier studies and as a book of reference.

THE HOSPITAL BALANCE SHEET

The Hospitals Year-Book, 1942. (Pp. 276.) London: Central Bureau of Hospital Information, 12, Grosvenor Crescent, S.W.1.

The twelfth issue of *The Hospitals Year-Book*, which in addition to its statistical tables relating to voluntary hospitals includes a useful directory of all hospitals, voluntary and municipal, is unavoidably late in publication, and the figures it presents are for the year 1940. That was a highly eventful year in hospital history owing to many hospitals being put out of action by the enemy, while the demand on others was excessive. But the figures, of course, do not admit of a very close comparison with those of earlier years. One notable feature is the increase shown in the receipts by voluntary hospitals for public services, which in London rose to £1,320,500, or double the figure for 1939, which again was double the figure for 1938; and an even more marked rise was seen in the Provinces and in Scotland. On the other hand, there was a drop in payments by patients. A remarkable feature, all things considered, is the steadiness of legacies. The amount received in this way by the voluntary hospitals of Great Britain from 1936 to 1940 was round about one and three-quarter millions a year, with no more than £100,000 difference between the highest figure and the lowest. Post-war changes are discussed, in particular the question whether the voluntary hospital method of administration, with usually a layman as chief administrator, or the municipal hospital method, with a medical man in that position, is the more likely to be preferred. The writer of an article included in the annual, Mr. Clayton Fryers, house-governor of the General Infirmary at Leeds, puts the case for the retention of the lay administrator method on the ground that a hospital is a complex business undertaking with an annual expenditure (in the larger hospitals) up to a quarter of a million, and a medical man, unless he has had special business training, cannot adequately supervise this side of the hospital's activities.

ENDOTRACHEAL ANAESTHESIA

Endotracheal Anaesthesia. By Noel A. Gillespie, D.M., B.Ch., D.A. (Pp. 187; illustrated. $4.00.) Wisconsin: University of Wisconsin Press.

This comprehensive monograph is a good augury for the future of anaesthesia. More of such excellence is needed. The administration of anaesthesia by the endotracheal route is one of the most valuable of the many arrows which every anaesthetist must now carry in his quiver, and countless lives are made safe every year by its employment. Dr. Gillespie has gathered in small compass most of what is known about this subject, and much of it will be new to his readers. The historical section is of particular interest, and points the moral that advances in anaesthetic technique take place *pari passu* with advances in physiological knowledge. The author gives his personal opinion wherever a variety of views obtains, and his early training in this country shows itself in the ready acceptance most of his views find among British anaesthetists. The experienced anaesthetist will turn the last page of this book with regret, and the novice will find sound advice wherever he reads. One small point for criticism, which stands out only because of the general high level of the rest, is that the description of blind intubation, which is, after all, at the very kernel of the affair, might have been more simple and not made to appear to the uninitiated such a complicated and difficult procedure. Most of the illustrations are good and of great help, but that on page 91 is a little obscure, and that on page 149, perhaps by a fault in printing, appears somewhat strange. Dr. Gillespie's book will be a valuable addition to every anaesthetist's bookshelf.

Notes on Books

The appetite of the general public for books and talks on health is insatiable. It is essential therefore that it should be properly supplied. Dr. HUGH CLEGG's pamphlet *How to Keep Well in Wartime* (issued for the Ministry of Health by the Ministry of Information, H.M. Stationery Office, price 3d.) is a marvel of compression, packed with sound advice and devoid of sentimentality. One's only regret is that the cover should depict a two-child family as typical of our day.

Dr. A. SPENCER PATERSON, psychotherapist in the department of psychological medicine, Middlesex Hospital, has prepared two handy case-taking schemes for the psychoses and neuroses. Each is printed on one side of a card, and they are sold together in a transparent envelope by H. K. Lewis and Co. Ltd., price 1s., postage 2½d. These cards have for some years been issued to medical students during their psychiatric training, and the schemes were reproduced for a wider audience in the *Practitioner*.

Preparations and Appliances

A MERCURIAL DIURETIC

A grain of powdered digitalis three times a day has kept many a patient with auricular fibrillation on his legs for years, and a weekly injection of a mercurial diuretic will often do the same for the patient with heart failure with normal rhythm. Considering the thousands of injections given, serious reactions are few and they are largely confined to patients with renal disease. Mersalyl is the *B.P.* preparation, and this is now being supplied by Boots Pure Drug Co. Ltd. in ampoules of 1 c.cm. and 2 c.cm. and in tablets which can be taken by mouth in mild cases.

ACETARSOL VAGINAL COMPOUND

Acetarsol vaginal compound (Boots) is a preparation of acetarsol with boric acid and carbohydrate supplied in tablets for local application in the treatment of leucorrhoea associated with *Trichomonas vaginalis* and also with the monilia group of infections. One or two tablets are inserted once or twice daily high up in the vagina. Usually an initial treatment of from two to four weeks is recommended. Remission may occur, even when symptoms are cleared up, and it is therefore advisable to use tablets for two or three months during the three or four days following menstruation, when relapses tend to occur. Samples and literature may be had from the Medical Department, Boots Pure Drug Co. Ltd., Station Street, Nottingham.

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A PANEL ON PEPTIC ULCER

The " Panel Discussion on Peptic Ulcer " at the last meeting of the American Medical Association[1] gives rise to chastening reflections on our ability to treat a disease which, as war enlistment has shown, begins at an earlier age and occurs with greater frequency than we realized four years ago. Duodenal ulcer is our main concern, for duodenal ulcer is both more common and less tractable than gastric ulcer. The patient with duodenal ulcer presents a distinctive pattern, which is localized not only in the duodenum but also in the digestive tract and the constitutional behaviour of the patient. The pattern is characterized by hypersensitivity, hyperirritability, and hyperactivity, which involve both the alimentary tract and the total personality. This psychosomatic make-up tends to run in families. We do not know whether it is inherited or acquired from early influences, but, if acquired, it must be regarded as a reaction formation of the whole personality and therefore unlikely to be amenable to the type of psychotherapy at the disposal of the average physician. Medical treatment is restricted to simple means of relaxing tension, a non-irritating diet, and medicaments to neutralize the corrosive gastric secretion. Owing to the difficulty of controlling the interdigestive secretion, particularly during the long night interval between feeds, the continuous intragastric drip was introduced, with the use of alkaline milk or the newer non-absorbable alkalis such as aluminium hydroxide gel. Winkelstein, who has employed this method for ten years, claims good results in the most resistant cases and has trained hospital patients to carry out the therapy at home. Nevertheless, the most enthusiastic advocate could hardly describe the intragastric drip as either a simple or a permanent cure of peptic ulcer.

The Panel agreed that there was only a limited field for the surgeon in the treatment of peptic ulcer. Operation should be restricted to ulcers which do not respond to routine medical treatment—about 15% of the total. Any procedure that does not remove the pylorus and the duodenal ulcer is inadequate. Gastro-enterostomy is unsuccessful in more than half of the resistant ulcers, and there is a high incidence of jejunal ulceration. The mortality of subtotal resection cannot be reduced much below 5%, and some 10% of the survivors will suffer from post-operative jejunal ulceration or haemorrhage. There are about 20% of recurrences when cases of gastro-enterostomy complicated by jejunal ulcer are treated by gastric resection. Thus a virulent ulcer diathesis can outwit the most painstaking surgery. Kiefer describes these figures as a challenge and an indication for the need for further advance in the surgical treatment of duodenal ulcer. They are an even louder challenge to the research worker. Operation should not be encouraged by the mere suspicion of malignant disease, though American results in the treatment of cancer of the stomach are more favourable than the average physician might have expected from his clinical experience. Walters, Gray, and Priestley[2] report that 10,890 cases of cancer of the stomach were seen at the Mayo Clinic in the period 1907–38 inclusive; 2,322 were fit for resection and survived operation, and of these 28.9% lived 5 years or longer. Thus 7% of the whole series survived 5 years or longer. Recent analysis also indicates that if frank ulcerating carcinomas are excluded, pre-pyloric ulcers are not more often malignant than gastric ulcers elsewhere in the stomach, and the tendency to refer these ulcers at once to surgery should be revised.

In so-called stenosing or obstructing duodenal ulcer, operation should not be advised without preliminary medical treatment, as the changes are usually inflammatory. After control of spasm and oedema and healing of the ulcer, many of these patients may go for years without a recurrence. Operation has little place in the treatment of haematemesis and melaena. The mortality in bleeding peptic ulcer is a direct function of the age. There are few deaths under 45, but thereafter the mortality rises rapidly. Contrary to general belief, more than three-quarters of all fatalities occur after the first haemorrhage, often before there is time to rush the patient to hospital or to institute active treatment. Series of cases for comparison should therefore be arranged in age groups, and not according as the bleeding is single or recurrent. Post-mortem study nearly always shows a large arteriosclerotic eroded artery in the base of the ulcer. Some patients will die whatever treatment is carried out. In a series of cases reported in the discussion conservative medical treatment of bleeding peptic ulcer resulted in a mortality rate of 7.2% irrespective of the age of the patient and the severity of the haemorrhage; among patients with bleeding ulcer treated by resection the total mortality rate was 22.2%. Among patients of 45 and older the medical treatment of peptic ulcer with severe haemorrhage resulted in a mortality rate of 21%; among similar patients treated by resection, the rate was 42.8%. There was no fatality among patients under 45 treated medically for severe haemorrhage, but surgical treatment resulted in a mortality of 30%. The contribution which surgery can make to the treatment of haematemesis and melaena is essentially prophylactic. Two out of every three fatal haemorrhages originate in a gastric ulcer, despite the greater frequency of duodenal ulceration. Post-operative ulceration is almost unknown after resection of the stomach for gastric, as distinct from duodenal, ulcer. There should therefore be no great delay in advising surgical removal of a gastric ulcer which resists medical treatment in a patient over 45. For duodenal ulcer, however, the indications for surgery appear to be limited to perforation, cicatricial obstruction, or persistent pain due to adhesion to a neighbouring viscus.

It has taken the medical profession a long time to learn that neither the dramatic intervention of surgery nor the elaborate ritual of the alkaline diet can banish the constitutional tendency to peptic ulceration. To separate the ulcer patient from his diathesis is like severing the fisherman from his soul, and until we learn some new secret of Nature we must be content to try to teach the patient how best to live at peace with his ulcer—and to do this he must probably learn how to live at peace with himself.

[1] *J. Amer. med. Ass.*, 1942, **120**, 733, 811.
[2] *Carcinoma of the Stomach*, Philadelphia, 1942.

MINIMUM STANDARDS OF FEEDING

It is a brave undertaking of the Economic Intelligence Service of the League of Nations to attempt a survey of rationing in European countries.[1] Even if a super-statistician could accomplish it adequately, a super-publicist would be needed to make the findings comprehensible. Here are more than a score of countries, each with a different kind of rationing system, appertaining to different groups of foodstuffs, and differentiated according to the

[1] *Wartime Rationing and Consumption.* Economic Intelligence Service of the League of Nations. (London: Allen and Unwin, Ltd. 3s. 6d.)

needs of various groups within each national community. So many qualifications are attached to the tables in which the rations are worked out in terms of grammes per week that the explanatory footnotes, indicated by letters, run nearly twice through the alphabet. Behind it all is the big uncertainty whether legal rationing corresponds to actual consumption. In some countries it is known that large groups of consumers cannot afford to buy their full rations; in others some of the rationed articles are unobtainable. The absence of rationing of certain foodstuffs, such as bread and flour in the United Kingdom, means a genuine lack of restriction, but in others, like the absence of meat rationing in Norway, it means that there is next to nothing to distribute. Milk is still nominally unrationed in Denmark, Sweden, Switzerland, and the Balkans, but this does not necessarily mean that there is no scarcity. Again, who is the "normal consumer"? Consumption varies with age, sex, health, and occupation. The "normal consumer," who represents the minimum standard of adult requirements, must surely be as elusive as the "hypothetical tenant" in the law of estate agency. In parts of Poland under the German heel Jews are not considered to be normal consumers; they are allotted not much more than one-third of the bread, flour, and sugar allowed to the "Aryan." On the whole, the ration card must be held to represent maximum rather than average consumption, even allowing for the fact that, no doubt, many people, by means legitimate or otherwise, are able to supplement their rations. The figures so painstakingly worked out by the compilers of this pamphlet thus furnish only the roughest inventory—and an optimistic one at that—of the bare larders of Europe.

Rationing during the last war was worked on the crudest basis. Except for some extra allowance to those engaged in heavy labour, almost all countries distributed food strictly per caput. This time there is a high degree of differentiation. The principle on which rationing is carried out in different countries may be said to follow one of two policies. In the United Kingdom there are basic rations intended to cover the average need of the average family for most of the important articles of food, but these are extended by canteen and municipal feeding schemes and by the priority system for children and mothers in respect of milk. The British method has the advantage of flexibility, though it does mean that some people in favoured situations get more than on a strict apportionment basis they should. The other policy is the much more rigid one which obtains in Germany, where rationing covers almost the entire field of consumption, so that hardly anything can be had without the ration card. This entails an elaborate differentiation between the rations of various occupational and other groups. Thus, while the allowance of bread and cereals, meat, and fats for a normal consumer is reckoned at a little less than 1,200 calories a day, for heavy workers it is 1,900, and for very heavy workers 2,650 calories. To take meat and meat products alone, in Germany the heavy worker receives twice, and the very heavy worker almost three times, the normal consumer's ration. Canteen feeding is organized in Germany, too, but there the workers appear to have to surrender coupons for factory meals. On the whole, the British method seems to be preferable, but here, as in almost all countries, there is some discrimination between classes, and quite a high degree of it in regard to milk for children, for expectant and nursing mothers, and for invalids, which is as it should be.

Some of the results which appear in the tables in this pamphlet are surprising. Thus, apart from Great Britain, Ireland, and Switzerland, where bread and flour are free of coupons and "points," the country of Western Europe with the most abundant bread and flour rations is occupied Denmark, and the country with the sparsest is neutral Spain. Germany lowered her bread ration and introduced potato rationing just a year ago (April, 1942). Until then the level of consumption was apparently maintained, but now some sections of the population may be slightly, though not critically, short of energy-building foods. Potato rationing was followed by a decline in bread and cereal consumption of something less than 20% on pre-war figures. In Norway and the Netherlands there has been a fall in these foodstuffs of between 20 and 25%; in Belgium and Czechoslovakia the situation is worse; in Poland and Italy the consumption of bread and cereals is down by one-half or more; and a still more serious state of affairs prevails in Spain, and actual famine in Greece. The consumption of sugar has been cut down most drastically in France and Switzerland. In the United Kingdom the tables show a reduction of about 50% on pre-war figures. In Germany more sugar appears to be consumed, but the pre-war figure for this foodstuff was low. The United Kingdom has the highest meat rations, and Switzerland the next highest; those for Germany and Sweden are only about one-half the British allowance, and in Italy and occupied France the legal ration is much lower. For fats the highest rations in Western Europe are to be found in Denmark, with the United Kingdom and Germany coming next, but the composition of the fats group of foods varies so much from country to country and from period to period that it is useless to seek comparative figures. The milk ration for children under 3 in the United Kingdom is given here as 570 grammes a day, and 750 grammes in Germany, but for older children the British rations exceed the German. The egg ration represents in the United Kingdom 29% of pre-war consumption, and in Germany 17%.

The consumption of foods yielding animal proteins remains relatively high in Denmark, Sweden, and Switzerland, owing mainly to the high consumption of milk; in the United Kingdom, where milk consumption in peacetime was low, it is satisfactory, and in Germany, the Netherlands, and Czechoslovakia it is far below pre-war standards. Total protein consumption, taking the League of Nations standard of optimum allowance,[2] is up to or above that standard in all the countries just mentioned; in France, Belgium, Norway, and Italy it is at minimum level, and in Poland and some countries further east, below it. Serious shortages of vitamin C are reported in Norway, Belgium, the Netherlands, and Poland, and the vitamin A position is unfavourable, though probably not critical, in Germany. The general deduction is that under-nourishment and malnutrition are prevalent in Italy, France, Belgium, Norway, Finland, and Spain, while Poland, Greece, and parts of Yugoslavia, especially Serbia, are in a state of, or bordering on, famine.

That is the broad picture, but to speak in terms of whole countries is highly misleading. A closer picture would show large differences, even within the same country, between urban, semi-rural, and rural communities, and between smaller groups and families. Rationing has not levelled out consumption, even though it has imposed a universal restriction. The important thing is the extent to which it has effected its larger purpose, not merely to limit the consumption of articles of which there is a temporary shortage but to ensure a minimum living standard for the population. Rationing is thought of as a withholding, but ideally it is a form of even-handed distribution which largely ignores individual purchasing power and is based

[2] The protein intake for all adults should not be less than 1 gramme of protein per killogramme of body weight, the protein to be derived from a variety of sources, and a part of it to be of animal origin.

on the physiological needs of the various members of the community. From that point of view the coupon in some form or other may remain as a passport in the post-war world and may be an instrument for ensuring freedom from want.

PENICILLIN

Prof. Florey and his collaborators at Oxford have already demonstrated the great potential therapeutic importance of penicillin, an extract from the culture fluid of the mould penicillium. The principal clinical interest of penicillin is, of course, that it will kill certain bacteria, such as *Staph. aureus*, for which there was previously no satisfactory remedy, and (unlike the sulphonamides) even in the presence of pus. Two different lines of investigation have been started as the result of this discovery. First, attempts are being made to purify penicillin itself in the hope that knowledge of its structure will lead to a less laborious and expensive method of preparation than fractionation from the crude extract. Incidentally this should also show how penicillin inhibits bacterial growth. Secondly, the antibacterial activity of large numbers of moulds other than penicillium has been examined with considerable success. According to Florey and his co-workers[1] the crude penicillin extract has a yield of about 4 Oxford units per c.cm. of culture fluid, but by means of absorption, distribution between solvents, and reduction a barium salt has been obtained, with an activity of 450 to 500 units per mg., which appeared homogeneous by chromatographic analysis. By elementary analysis an empirical formula has been suggested for this salt, but its structural formula is necessarily more difficult to ascertain. This purified penicillin completely inhibits the growth of *Staph. aureus* at a dilution of 1 in 24,000,000 to 30,000,000, and is free from toxic reactions as judged by its effect on leucocytes or on mice into which it has been injected. It is very unstable, and is readily inactivated by treatment with acid, alkali, or boiling. In the form of the dried barium salt, however, it keeps its antibacterial power indefinitely.

Among other substances having bactericidal properties and isolated from bacteria or fungi are: pyocyanase from *Pseudomonas aeruginosa*; tyrothricin (gramicidin and tyrocidin), isolated by Dubos and Hotchkiss from *Bacillus brevis*; actinomycin A and B, isolated by Waksman from *A. antibioticus*; and pro-actinomycin. Gardner and Chain[2] were led by their discovery of the last named to investigate a large number of saprophytic actinomycetes, and found that of a total of 52, 10 were bacteriostatic in some degree to the Gram-positive cocci. There is obviously a great deal of work to be done in the classification of these derivatives and the selection of those most suitable for therapeutic trial. Some of them, such as tyrocidin, pro-actinomycin, or claviformin (isolated by Chain, Florey, and Jennings from *Penicillium claviforme*[3]), although their antibacterial activity is high, are unsuitable because they are toxic to mice and stop the movements of leucocytes in high dilution after only a few minutes. The bactericidal activity of such substances is, perhaps, only one expression of a general toxicity to living tissues. Gramicidin,[4] which is now known to be a complex polypeptide and has been crystallized, has limited use in therapeutic trials, for similar reasons. Though much less reactive than tyrocidin, it is relatively insoluble: its antibacterial activity is readily reduced by cephalin, and it is toxic on intravenous injection. However, it is so much less dangerous when applied locally or injected subcutaneously or intramuscularly that it may yet come to be of practical importance. The search among these "bacteriostatics," which will attack the bacterial infection without harming the patient, has already produced a large number having fastidious inclinations—for example, they will inhibit the growth of one strain of staphylococcus without affecting others. Therein may lie future difficulties for the clinician, but the advantages which these new therapeutic substances offer are so great that their future development is clearly a matter of the first importance.

1 *Brit. J. exp. Path.*, 1942, **23**, 103, 120.
2 Ibid., p. 123.
3 Ibid., p. 202.
4 *Trans. & Studies Coll. Phys. Philadel.*, 1942, **10**, 11; *Proc. Mayo Clin.*, 1942, **17**, 321.

SLOWER NEUTRONS

The destructive action of fast neutrons on living tissue is known to be due to the recoil nuclei, especially hydrogen nuclei, projected by neutron impact; as with *x* rays or gamma rays, the biological effect is a result of absorption of energy by the tissue from charged particles of high energy. In all cases the destructive action occurs throughout the irradiated tissue, but the passage of slow neutrons through the body is not accompanied by the production of such energetic recoil protons, and there is thus little or no resulting damage. Fast neutrons have been used in cancer therapy,[1] but we commented four years ago on the possibility of locally increasing the absorption of energy by neutron-capture reactions with light elements such as boron.[2] Zahl and Cooper,[3] realizing that direct hypodermic injection of slow neutron-capturing materials into tumours was not clinically feasible, substituted lithium for sodium in certain acid dyes which Ludford had shown were selectively absorbed by tumour tissue after intravenous injection. In tumour-bearing mice the concentration of lithium after intravenous injection of lithium-carmine was found to be three times greater in the tumour than in the blood, and in the experiments performed a lithium content of 0.03% was attained in the tumour. This concentration of lithium will capture 10% of the available slow neutrons, and results in an absorption of energy which is nearly three times that in tissues not containing lithium. If the isotope Li^6 is used in place of Li^7 the capture of neutrons goes up to 55%; and the energy absorbed is then more than ten times greater than in tissues not containing lithium. It is not, however, the total energy absorbed but the difference in energy between tumour and healthy tissue which determines the optimum treatment condition. This "dose-differential" depends not only on the difference in the concentration of lithium in the tumour and in the adjacent tissues—the "localization factor"—but also on the absolute quantity of lithium in the tissue, since the "dose-differential" passes through a maximum as the quantity of lithium is increased. So far a localization factor of 2.0 has been attained, giving a gain of 43% in the radiation dosage of the tumour over that of the other tissues; but if the localization factor could be increased to 10 the gain would be 125%.

Zahl and Cooper have so far concerned themselves with establishing the physical and biological facts on which any clinical attempts at therapy with slow neutrons must be based, but they point out that much greater biological effects may be expected than the physically determined dose-differentials would suggest. While the relations between biological damage and density of ionization along the path of a particle are not clearly understood, it seems fairly certain that the biological effectiveness of heavy particle ionization (such as is produced by neutron-capture) is greater than that of electrons (resulting from *x*-ray absorption) by a factor ranging from 2 to 10 or more.

1 *British Medical Journal*, 1941, **1**, 447.
2 Ibid., 1938, **1**, 292.
3 *Radiology*, 1941, **37**, 673.

If such a factor is found to apply to the present experiments, the dose-differential of 43% would be considerably increased.

CONTROL OF MOSQUITOES IN BRITAIN

A second and revised edition of the "Memorandum of Measures for the Control of Mosquito Nuisance in Great Britain," with a prefatory note by its Chief Medical Officer, Sir Wilson Jameson, has recently been issued by the Ministry of Health. The authors are Lieut.-Colonel J. A. Sinton, V.C., I.M.S., Adviser on Malaria to the Ministry, and Mr. P. G. Shute, Assistant Malaria Officer, Ministry of Health. Dr. P. G. Stock has been responsible for revising this publication, and in this he has received help from the Keeper of Entomology, British Museum (Natural History). Though the account given in the memorandum of 32 pages, costing 6d., is necessarily concise and condensed, very little of importance in connexion with the mosquitoes of Great Britain and their habits and methods of control is omitted. The memorandum will be found a most useful source of knowledge by those whose interests or responsibilities bring them into touch with this aspect of the public health. In addition to what was given in the previous edition (1940), the present one provides some new and useful information on the control of mosquito breeding in static water tanks. There has also been added a short appendix, giving some notes on other biting flies than mosquitoes which may at times be troublesome in this country. We have already commented, when reviewing the first edition,[1] on the fact that, besides the common house mosquito, *Culex pipiens*, which breeds mostly in outdoor water butts and other open collections of water, and which incidentally rarely bites man, there is a very similar-looking species, *Culex molestus*, only recently recognized as distinct from *C. pipiens*, which bites man freely. *C. molestus*, it now appears, selects as its breeding places water which is in continuous darkness or semi-darkness, and has so far not been found, according to the memorandum, in static water tanks above ground. Larvae, however, are to be found everywhere in the stagnant water in the inverts below the station platforms of the Underground railways and in sumps along the railway line. It does not follow, however, that the mature insects do not occur above ground, and they may be a source of nuisance in houses in urban areas. Other species of culicine mosquito occur and may be troublesome under rural and semi-rural conditions, and such species are briefly described, with their habits and breeding places. More important than the culicine mosquitoes, since they may be actual carriers of disease, even in this country, are mosquitoes of the genus *Anopheles*. One variety—that known as the *atroparvus* variety of the common *A. maculipennis*—is the cause of indigenously contracted malaria, especially under war conditions, when many soldiers and others returning from abroad provide the necessary sources of infection. During the last war some 500 cases of malaria proved on investigation to have been locally contracted in this country. In the text of the memorandum are two very interesting maps comparing the distribution of malaria in England in the eighteenth century, when, under the name of ague, malaria was relatively common, with that of indigenously contracted cases recorded during and after the last war. The areas—chiefly south of the Humber, in an extensive area about the Wash, on the Essex coast, in the Thames valley, and in parts of Kent—are almost identical. It is in these areas that local bodies and medical men should be particularly alive to the possibility of locally transmitted malaria and the importance of taking such precautions as are desirable.

[1] *British Medical Journal*, 1941, **1**, 408.

SIDE-TRACKING THE LIVER

New methods of administering drugs are always of interest, and modern therapeutic requirements, which postulate the slow, steady liberation of a substance within the body over a period of months or even years, as in pernicious anaemia, Addison's disease, and other hormonal dyscrasias, have led to a number of ingenious devices. Thus "replacement therapy" may be attempted by the implantation of tablets subcutaneously or by the injection of an oily solution from which the active substance is slowly liberated. The patient with myxoedema is fortunate because the missing substance is not destroyed during digestion, but the diabetic must resign himself to his daily injection. Sublingual therapy—the absorption of a drug from a tablet which is placed beneath the tongue and is slowly dissolved in up to half an hour—has the advantage that it is simple and not unpleasant for the patient. Though still mainly in the experimental stage, it has already been found useful in the treatment of Addison's disease. While there is reason to believe that desoxycorticosterone acetate is not as efficient as the crude extract of the adrenal cortex, sublingual administration has proved valuable in patients whose condition has become stabilized, and who can be discharged on a diet and maintenance dose.[1]

Sublingual therapy is now being tried with some success with the sex hormones. It is well known that many of these compounds (except, of course, synthetic analogues such as stilboestrol) are relatively ineffective by mouth. But, as Miescher and Gasche[2] have shown, alcoholic solutions of testosterone, methyl testosterone, and oestradiol are far more effective in encouraging the growth of the secondary sexual characteristics in castrate albino rats when administered sublingually than when given by stomach tube. It has been suggested that this difference is due, not to inactivation by digestive juices or failure of absorption, but to inactivation of these compounds as they pass by the portal circulation from the intestines through the liver. Burrill and Greene[3] found that testosterone and methyl testosterone were very active when implanted subcutaneously in castrate rats, as judged by the increase in weight of prostate and seminal vesicles over castrate controls. When the pellets were implanted in the spleen, so that the androgens were carried directly to the liver on absorption, methyl testosterone still had a little effect but testosterone was completely ineffective. (Even when orally administered methyl testosterone is active to some extent, so perhaps the methyl side-group may delay its destruction by the liver.) If the liver naturally detoxicates these sterols sublingual administration will side-track the liver, and the sterol will be absorbed directly into the peripheral blood stream. Spence[4] has already detected this difference clinically, for in the case of a eunuch sublingual administration daily of two tablets of 5 mg. each was sufficient to maintain normal potency, whereas when the substance was swallowed three such tablets were required. This side-tracking of the liver is an unusual advantage to be claimed for any method of treatment, but there is evidently sufficient value in sublingual therapy for an extensive trial.

Sir Henry Dale, P.R.S., has been awarded the Harben gold medal by the executive committee of the council of the Royal Institute of Public Health and Hygiene. This medal, which is international in character, was instituted in 1894 and is conferred every third year for "eminent services rendered to the public health."

[1] *Schweiz. med. Wschr.*, 1942, **72**, 768.
[2] Ibid., p. 490.
[3] *Endocrinology*, 1942, **31**, 73.
[4] *British Medical Journal*, 1942, **1**, 668.

MILITARY ORTHOPAEDICS

At a special meeting of the British Orthopaedic Association, held in London under the presidency of Mr. G. R. GIRDLESTONE of Oxford, Lieut.-Col. St. J. D. BUXTON, after first describing the organization of the orthopaedic service in the Middle East, went on to discuss the clinical work done out there. Primary suture of wounds, he said, especially those complicated by fracture, was to be avoided in the Western Desert. Foreign bodies should not necessarily be removed at forward operating centres. When amputation was carried out in the forward area the stump should be dressed with sulphanilamide powder and a loose vaseline gauze pack. A stitch or two might serve a useful purpose, but closure of the wound was to be condemned. If a wound was packed in a forward area, care must be taken that this packing was loose and did not act as a plug. There was ample evidence that limitation of change of dressings and the use of plaster-of-Paris splinting were an advance in the treatment of gunshot wounds of the limbs. Out of 200 cases of gunshot wounds causing fracture of the femur deaths at the base numbered 13, and amputations also 13. Of 273 wounds of the knee-joint 178 were non-suppurative and 95 suppurative; five patients died from various causes and 12 amputations were carried out. Of 51 wounds of the elbow-joint 12 were complicated by injury to one or more nerves; two arms were amputated; no death was directly due to the lesion of the joint.

Col. E. C. CUTLER, U.S. Army Medical Corps, emphasized that there was no place in the forward areas for the limited specialist; men there should have had adequate general surgical training. He emphasized the value and probable importance of air transport for the wounded in modern campaigns, so that cases requiring special treatment could at an early date be evacuated to the general hospitals where full orthopaedic facilities were available. In his view, orthopaedics had an important part to play in the application of its principles to the problems of trauma: lessons which could well be carried back to the medical schools and the benefit ultimately of civil practice.

Finger Injuries in Tank Crews

Major FURLONG, discussing four "minor" injuries, dealt first with a type of finger injury commonly seen in tank crews—a crushing of the tip of one or more digits by the sudden closure of roof-flaps. He emphasized the need for conservatism in regard to end-tissues, and described satisfactory results obtained by covering the ends of the fingers by whole-thickness skin grafts, with loose dressings to avoid rigid immobilization and consequent stiffness. In fractures of the metacarpals the surgeon should regard the injury as a contusion of the hand rather than a fracture, and so should pay attention to the restoration of function in soft tissues rather than to splintage. Return to duty after Bennett's fracture was quicker and more satisfactory if reduction was not attempted. For fractures of the clavicle he advocated auto-reduction by the soldier employing the "hips-firm-shoulders-braced-back" attitude, during which a figure-of-eight bandage should be applied over both shoulders without padding. The patient's whole effort should then be to maintain the position actively. Early movements and return to light duty with his unit at the end of three weeks were the rule.

In a paper on the surgical treatment of osteomyelitis the result of penetrating wounds, Major G. PERKINS said the osteomyelitis pursued one of five courses: (*a*) the inflammation might resolve and never again trouble the patient; (*b*) it might continue as persistent acute osteomyelitis; (*c*) the acute inflammation might subside leaving a sinus down to the interior of the bone; (*d*) it might heal but after months or years might recur—the wound had flared; (*e*) there might be a persistent sinus associated with recurrent "flares" of acute inflammation in the bone. In persistent acute osteomyelitis surgery was rarely necessary to cure the inflammation; drainage because of the wound was usually adequate. Later amputation might be advisable, either to save life or because an artificial limb would be of more use to the patient than his own crippled leg in cases with an ununited fracture or serious nerve lesions which could not be sutured, or soft-tissue loss. In the next group of cases the sinus might remain (1) because of the presence of a foreign body or sequestrum or (2) because of continuation of mild chronic infection of the bone. In (1) the cavity should be exposed carefully without excision of the track which had been opened up, dead fragments should be removed, followed by light suture without drainage. Careful judgment was required because sequestra and foreign bodies were not always revealed radiographically, and also because of the difficulty in deciding when inflammation had sufficiently subsided to permit such interference. When operating for continued infection without sequestra the procedure was different as the object was to remove all infected bone. This, of course, might not be entirely practicable. Here the obliteration of cavities was important; no more than half the circumference of the infected bone should be chiselled away, care being taken not to fracture the bone. The immediate sequel was acute inflammation of the bone that was left; therefore there must be free drainage by light packing with paraffin-soaked gauze, which should be removed as soon as a "safety valve" was no longer needed. Major Perkins emphasized the need for conservatism in recurrent attacks of acute osteomyelitis, the essential treatment being rest; surgery was not indicated unless an abscess formed, and then only an exit for pus was necessary. Cases in which there was a sinus associated with recurrent flares as a rule defied treatment; usually there was a continuous grumbling inflammation in a bone that was riddled with organisms. The more serious cases in the lower extremity amply justified amputation, which first should be done through the lowest limit of healthy bone. When all sepsis had been eliminated the final amputation was done at the site of election.

Knee-joint Injuries

Major T. T. STAMM, discussing injuries to the knee-joint, said that in civil practice the operation for the removal of a torn semilunar cartilage had always been regarded as one of the most satisfactory of all surgical procedures. Those who had had the opportunity of dealing with large numbers of troops would agree that in general the results of this operation in the soldier were most disappointing. The men themselves had come to regard it with increasing suspicion, and not without reason, having observed bad or indifferent results among their fellows. Bad results following surgery were doubly unfortunate in the Army, for not only did they render the individuals concerned inefficient fighting units but they might cause others to refuse operation when they could have been cured. Inexpert operative technique was rarely the cause of these poor results, which could usually be traced to inaccurate diagnosis or mistaken judgment in immediate or post-operative treatment. He stressed the need in diagnosis for examination of the joint under intravenous anaesthesia. The injury most often missed was a lesion of the anterior cruciate ligament, which was probably the commonest of the injuries sustained by the knee. It might be the only lesion present, and in such cases it was nearly always possible to lock the joint and unlock it while performing a diagnostic test which had been elaborated by Mr. Lambrinudi. All degrees of damage to the ligament were encountered, from a simple sprain to a complete rupture. It was in cases with minor degrees of damage that mistakes might result, since the knee was held flexed by spasm of the hamstrings, which might be mistaken for locking of the joint. In late cases there were two groups of symptoms: first, those due to the lesion itself—a feeling of insecurity and of the knee "coming forward" suddenly when under load in the semiflexed position: there was no actual locking; secondly, those due to slipping of one or other cartilage, usually the medial: momentary locking was the main feature. In spite of the symptoms, no lesion of the cartilage would be found at operation. While operation might be justified in a few selected cases where repeated attacks of locking caused severe disablement, as a general rule it should be avoided, as the results were not good and did not permit the individual to be up-graded.

Discussing true cartilage tears Major Stamm emphasized the importance of differentiating between tears of the substance of the cartilage and peripheral detachments of the cartilage from the capsule. The former occurring in the non-vascular material produced less reaction but did not heal. In the latter the reaction (haemarthrosis, tenderness, etc.) would be severe, because of the vascularity and sensitivity. Paradoxically, therefore, those injuries which appeared more severe did best with conservative treatment and healed as well as any other.

In the apparently less severe cartilage lesions operation would more often be necessary. Major-General MUNRO and Prof. HARRY PLATT emphasized the need for thorough investigation by medical officers at the time of the first injury, when details of the mechanism involved could be ascertained, the nature of the lesion determined with accuracy, and correct prognosis given. Major STAMM agreed that patients with internal derangement of the knee should be treated like fracture cases and sent to hospital at once.

The need for early, accurate diagnosis was stressed in a discussion of another common injury—namely, fractures of the carpal scaphoid. Major G. D. ROWLEY, reviewing 450 cases, said difficulties were experienced not only because of delay in diagnosis but because of imperfect suspension and immobilization. In fractures occurring in the proximal third and those with displacement of fragments the prognosis appeared to be poor. It seemed questionable whether a graft was ever justifiable in a private soldier. A certain number of delayed unions would unite if immobilized over a long enough period. For recent strains in old-standing lesions plaster immobilization for four to five weeks would often relieve symptoms. If there was not a perfect result a soldier would have difficulty in handling a rifle or ammunition as a member of a gun crew. These facts must be considered when advising treatment or in making recommendations for medical category.

Mr. C. LAMBRINUDI brought forward important new evidence concerning the mechanics of the carpal joints in relation to displacement of the scaphoid fragments, which he showed to be associated with a minor degree of subluxation of the lunate bone. The "cystic" appearance seen in some fractures of the scaphoid was due to "opening" up of the fracture gap. He stressed the need for accurate reduction of all scaphoid fractures and of the intercarpal subluxation before the application of plaster fixation. Major SOTO-HALL of the U.S. Army Medical Corps also emphasized this and the method of impaction to be achieved by a manœuvre which he demonstrated. In fractures of the right scaphoid the surgeon's left hand provided counter-pressure against the lower end of the humerus with the elbow flexed, while pressure was exerted by the first interosseous space of his right hand against the interosseous aspect of the patient's first metacarpal, whose wrist was forced into slight dorsiflexion and radial abduction—plaster being applied in this position and including the interphalangeal joint of the thumb. Over 90% of perfect results should thus be obtained.

Future Civil Accident Services

During the meeting Mr. R. WATSON-JONES presented a report on behalf of the executive committee dealing with the future of accident services, which was approved by the association.

1. The B.M.A. Fracture Committee in 1935 and the Delevingne Committee in 1939 recommended the development of special fracture services based on the principles of segregation of cases and continuity of treatment and after-care under a unified control.

2. The comprehensive accident service of the future is a natural development of organized fracture services which was foreshadowed by the B.M.A. and Delevingne reports. It should embrace the treatment of soft-tissue injuries, infections of the hand, burns, tendon injuries, nerve injuries, and indeed all injuries of the locomotor system. These injuries are no less incapacitating than fractures, their importance to industry is just as great, and numerically they outnumber fractures in the proportion of five or ten to one.

3. In general the problem will be solved more readily by the reorganization of accident departments of general hospitals than by the formation of special accident hospitals. The accident department must be reorganized, replanned, and often rebuilt. There must be a separate organization, and even a separate door of entry for accident cases on the one hand and acute medical and surgical emergencies on the other.

4. The director of the accident service should be a surgeon who is first trained in every branch of surgery, is then experienced in orthopaedic surgery, and is specially trained in the problems of trauma. He will collaborate with surgical colleagues who treat visceral injuries, and with physicians, bacteriologists, and representatives of other special branches of medicine.

5. It would be very inadvisable to propose the development of a new branch of surgery—"traumatology"; or to train "traumatic surgeons" whose skill would be disseminated over the vast fields of locomotor, abdominal, thoracic, facio-maxillary, ophthalmic, and cerebral surgery.

6. Since the accident unit must provide a twenty-four-hour service, it is considered essential that the director should be aided by two first assistants, in addition to the usual resident surgical officers, house-surgeons, and house-physicians. There must be full secretarial and clerical assistance, and almoners or social service personnel. A close liaison must be established with industrial medical officers in the area served by the accident unit.

7. The rehabilitation of sedentary and light industrial workers can usually be completed within the hospital itself by physiotherapy, occupational therapy, and recreational therapy; but for the rehabilitation of more seriously injured patients who must return to heavy industry the accident service must have a special rehabilitation annexe with playing fields, swimming pools, and gymnasiums. Such special centres are essentially medical units where treatment is continued by the same team, and they must remain under the same administration and surgical control as the parent hospital.

COMMITTEE ON NUTRITION SURVEYS

Investigation on certain aspects of nutrition is at present handicapped by lack of co-operation. Investigators may be ignorant of other work similar or related to their own; they may have difficulty in finding others who could co-operate in making their work complete; they may use different methods, the results of which are not comparable. The most striking example is that of estimations of haemoglobin levels, which have been made by a variety of methods, some of which are by no means satisfactory. In this particular case the Medical Research Council has set up a committee with the object of co-ordinating surveys of haemoglobin levels and some other blood examinations.

There remains, however, a wide field that is not covered by any existing organization. In view of the importance, at the present time, of a thorough knowledge of the state of nutrition in the country, the Nutrition Society has set up a committee on Nutrition Surveys, with Sir Joseph Barcroft as chairman. The terms of reference are the co-ordination of nutrition surveys dependent on (*a*) clinical, physiological, and biochemical examinations of human subjects; (*b*) examinations of food budgets; and (*c*) chemical analyses of food and meals (including collective meals). It will put investigators in touch with others who are working on the same lines or would co-operate; it will supply information, recommend methods, and make periodical summaries of the results of investigations. The committee has the support of the Ministries of Health and of Food and the co-operation of the Services. Prof. J. R. Marrack has been appointed as a director serving under the committee. All who are engaged on or undertaking investigations covered by the terms of reference are invited to communicate with him at the London Hospital, Whitechapel, London, E.1.

Reports of Societies

SULPHONAMIDE THERAPY

At a meeting of the Fever Hospital Medical Service Group of the Society of Medical Officers of Health a discussion on chemotherapy was opened by Dr. B. BARLING (L.C.C.), who, after tracing the development of the sulphonamide group of drugs, pointed out that hundreds of preparations had now been synthesized but only some six were in common use in this country. An effective blood concentration of 3 to 15 mg. % depended on (*a*) regular intake of the drug and (*b*) the output of urine. During treatment sulphonamide was found in all normal tissues except fat and compact bone and in all normal and pathological body fluids. Most drugs in the group passed into the cerebrospinal fluid, some more readily than others.

In discussing the mode of action of the sulphonamides, Dr. Barling pointed out that their bacteriostatic action could be blocked by para-amino-benzoic acid or substances clinically allied thereto, which included a number of local anaesthetics in common use. In this way sulphonamide might be rendered virtually inert. Large-scale experiments in gonococcal cases showed that sulphonamide resistance could appear as (*a*) an absolute resistance, (*b*) a relative resistance, or (*c*) an acquired resistance due to the use of too small a dose. This last, he felt, was a real danger which was not new to chemotherapy; it already had been often encountered in the specific treatment of trypanosomiasis. Dosage, therefore, must be adequate, and he suggested 1 gramme of sulphonamide for every 20 lb. of body weight in an adult; this amount to be multiplied by two in the case of children and by four in infants. The total

amount thus obtained should be divided so as to administer the drug at regular four-hourly intervals throughout the twenty-four hours. Given adequate dosage, the next important step was to choose a preparation of the drug to which the infecting organism was known to be sensitive. If no obvious response was obtained it was quite wrong to persist with the drug for longer than 7 to 10 days. Another common fault was to attempt sulphonamide therapy of deep abscesses or infected wounds without preliminary surgical treatment.

Chemotherapy in Pneumonia

Dr. THOMAS ANDERSON (Glasgow) thought it could be assumed that the value of chemotherapy in pneumonia had been proved but there were important aspects of the results of chemotherapy which might be discussed. Pneumococcal pneumonias generally, for example, showed a considerable variation in severity and mortality when treated with sulphonamides, depending on the serological type involved. The results of chemotherapy in Glasgow, where the commonest type of pneumococcus has been Type II, were much less impressive than in the South of England, where the more benign Type I infection was prevalent. The results in Type III infections varied principally with the age of the patient. During 1939-40 and in the early part of 1941 Type III cases were predominantly among the older age groups and carried a high fatality rate. Since then, among younger persons, Type III cases had been much milder. Age appeared to be of increasing importance in assessing results obtained by chemotherapy in pneumonia. Taking Type II infections alone, he found that the fatality rate in persons under 40 years had fallen as a result of chemotherapy from 22 to 4%, whereas in the older age groups the fall was from 46 to 25%. Further, an analysis of 69 consecutive pneumonia deaths in cases treated by chemotherapy showed that 81% were in persons over 40 years of age. Bacteriaemia was another important factor in determining the outcome of an attack of pneumonia, and there was some reason for believing that the risk of bacteriaemia increased with age. The relative failure of chemotherapy in those over 40 with bacteriaemia was probably due more to the impoverished defences of the host which permitted bacteriaemia than to the presence of the organism itself in the blood stream. One of the most disturbing features about pneumonia cases treated by chemotherapy was the prolongation of convalescence by delayed resolution. The incidence of this was again greatest in those over 40 years and in those with bacteriaemia, which also appeared attributable to lack of tissue resistance.

Generally, Dr. Anderson felt that the introduction of the sulphonamides had not removed pneumonia from that group of diseases which required intensive study. Could the factors described, which influence the outcome, be related to treatment? He was not convinced that better results could be obtained in the "bad risk" groups by increasing the dose of the drug, and there was no evidence that the drug was less well absorbed by persons in the older age groups. Combined treatment with chemotherapy and serotherapy, using specific serum, produced no better results as judged by fatality and delayed resolution than chemotherapy alone. Nor did vaccines as an adjuvant appear to influence the course of the disease. In conclusion, he suggested that the lack of specificity of drugs of the sulphonamide group, which were effective against a wide variety of organisms, argued in favour of the view that the drug acted principally by rendering the organism more susceptible to the natural defences of the host. That being so, tissue resistance was a more important factor in promoting recovery from and resolution of pneumonia than the presence of specific antibodies or neutralizing substances.

Meningococcal Infections

Dr. H. STANLEY BANKS (L.C.C.) considered sulphathiazole the drug of first choice for meningococcal infections. Comparing 200 cases treated with sulphapyridine with 300 treated with sulphathiazole he found the latter drug apparently more potent and much better tolerated. The use of this drug or sulphadiazine made all the difference to the comfort of the patients. Supplies of sulphathiazole had recently improved and were soon likely to be generally available. The cost at present was about double that of sulphapyridine, but with increasing demand should soon be reduced. Sulphadiazine was the drug of second choice, but at present was very expensive and had to be imported. As a practical compromise, until supplies were normal, all but the most severe cases could be treated with one or the other of these drugs for the first three or four days and the course completed with sulphanilamide. A standard of dosage based on body weight was fallacious if applied to all ages. Infants excreted the drugs rapidly and required 2 to 3 times the adult standard in proportion to body weight. No infant should be given less than 3 grammes daily during the first two days of treatment. For adults during this period 9 grammes daily was an appropriate dose, and for children an intermediate amount according to age. The mortality had been greatly reduced by chemotherapy. In 1940 and 1941 approximately 20% of notified cases died, compared with about 60% in pre-sulphonamide years. Judging by certain large series of hospital cases in which the case-fatality rate was as low as 6 to 8%, he thought that the mortality of this disease in the country generally could be still further improved. The chief types in which a high fatality rate was unavoidable were those (1) with adrenal involvement, (2) with encephalitis, (3) with ordinary meningitis undiagnosed and untreated till a late stage. Age should be only a secondary factor in fatality. Quite low fatality rates in infancy and over the age of 45 years had been achieved.

Acute Gastro-intestinal Disorders

Dr. W. GUNN (L.C.C.) classified acute gastro-intestinal disorders into three categories: (1) enteral causes due to specific organisms; (2) parenteral causes in which the intestinal upset is due to a focus elsewhere, frequently the upper respiratory tract; (3) causation unknown, commonly called acute gastro-enteritis or infective enteritis, but numerous designations had been employed at different times. Routine use of highly enriched or selective media (desoxycholate citrate agar for dysentery-salmonella group and Wilson Blair media and tetrathionate broth for enteric group) and rectal swabs as well as faeces had greatly improved diagnosis in the last few years. The employment of sulphaguanidine (3 grammes t.d.s. for 3 days and b.d. for 4 days, making a total of 51 grammes in 7 days) in 23 cases of Flexner dysentery resulted in more rapid clinical recovery (diarrhoea 2.6 days against 5.8 days) and elimination of organisms (6.8 days compared with 15.1 days) than in an approximately equal number of controls observed at the same time. No such beneficial effect was observed in 7 cases of salmonella (Thompson) food-poisoning and 7 carriers compared with controls. The total admissions of acute gastro-enteritis to a fever hospital during 1942 were analysed; the case fatality of unselected cases was 20.3%, but in the severe group accompanied by dehydration it rose to about 50%; of 22 severe cases treated with succinyl sulphathiazole or sulphasuxidine (supplied from the M.R.C. through the courtesy of Sir Henry Dale) 12 died. The case fatality was 45.5%. The rationale of the treatment was a reduction or elimination of coliform organisms allowing earlier oral administration of sugar than was possible without the drug. The verdict on the measure must for the present remain one of not proven.

Sulphonamides in Measles

Dr. R. SWYER (L.C.C.) recorded the results of an experiment carried out with sulphanilamide and sulphapyridine during the 1940-1 measles epidemic. One or other drug was administered for a period of four days after admission to 324 children suffering from measles. A further 869 children were observed as controls. No significant effect could be demonstrated either on the initial phase of the measles attack or on the incidence of complications. He felt, therefore, that the indiscriminate use of these rather toxic drugs could not be justified prophylactically in measles. Used therapeutically for certain complications, the results were better; the complications most likely to benefit being those due to streptococci or pneumococci, particularly bronchopneumonia. The fatality rate among measles-pneumonia cases treated with sulphonamides was 11.2%, compared with a 30% mortality experienced in a pre-sulphonamide epidemic. The results of chemotherapy in established measles-otorrhoea were less satisfactory, but he felt that his series was too small for any definite conclusion to be drawn. There was a danger, he thought, in using sulphonamides in the early stage of otitis media, unless the patient was under expert and continuous observation, because the symptoms of onset of mastoiditis could be masked thereby.

PSEUDOHERMAPHRODITISM

At a recent meeting of the Section of Obstetrics of the Royal Academy of Medicine in Ireland Dr. EDWARD SOLOMONS reported a case of pseudohermaphroditism due to hyperplasia of both adrenals. The patient, aged 18 years, had never menstruated and was suffering from generalized hirsutism and had a very enlarged clitoris. There was no vagina and the breasts were undeveloped. Laparotomy revealed the presence of underdeveloped female internal genital organs. The adrenals were symmetrically enlarged. The only other noteworthy feature was the urinary excretion of enormous amounts of 17-ketosteroids.

Dr. O'DONNEL BROWNE said he had a patient, aged 22, who had never menstruated and was probably a case of pseudohermaphroditism. She had definite ovaries, no testicles, no vagina, well-marked clitoris, and good distribution of hair. Findings were identical with those of Dr. Solomons's case. On laparotomy definite enlargement of both adrenals was found, in particular in one. Mr. Gill tried to remove what could be removed of the adrenals. Examination of the specimen showed that the tissue which was removed was malignant. The ultimate result he could not tell as it was too recent to report fully.

Correspondence

Gastro-enteritis in Infants

SIR,—After reading the interesting article by Drs. Elaine Field, D. MacCarthy, and W. G. Wyllie (March 27, p. 371), I turned up our records to find that, barring Sonne dysentery and enteritis complicating fevers, we have in the past eight months treated for "gastro-," "infective," or "zymotic" enteritis 146 children under 2 years of age with 21 deaths. Of course no comparison with the Great Ormond Street group is possible or intended. Our series was more heterogeneous, nor do I doubt that it was diluted with a number of instances milder than any of those dealt with in the article; still we did encounter very severe cases, including many with the deadly coffee-ground vomit and occasionally even frank haematemesis (three only recovered; but what is the cause of this evil symptom?).

The point I should like to see stressed is the importance of the nurse in the management of these cases. A ward full of such infants imposes a great strain on the whole staff, but a skilled and conscientious sister can work wonders with most unpromising material. Our medication was simpler and less systematized than that of the G.O.S. series, relying more on simple subcutaneous infusion, less on intravenous drip. Some did receive intravenous infusions on the lines laid down in the article, but none benefited, for all treated in this manner died ultimately of starvation. Another point is the use of Benger's food when restoring the starved babies to a milk diet. No mention is made of this product in the article, though our most experienced nurses swear by it. At the very least our results are no worse than anyone else's.

It is worth noting that the majority of our cases were admitted directly from their homes, for here is another point of some public importance. On several occasions the arrival in hospital of a sick baby has been quickly followed by the appearance of enraged parents accusing some day nursery, residential home, hospital, or what-not of poisoning their child, of incompetence, of neglect, etc.

Now anyone experienced in this disease knows that infection of the milk has little or nothing to do with the matter; indeed, when a recognized pathogen is found in stool or vomit the prognosis is thereby improved. Our cases were uniformly negative. Though doubtless, in the words of Jeremy Taylor, "we long for perishing meats, and fill our stomachs with corruption" (for how could we digest the incorruptible?), in this condition surely some more volatile essence, probably a virus, must be sought. In many of our cases there seemed to be a well-defined prodromal period, followed in three or four days by a rise of temperature and an exacerbation of symptoms suggesting that we are dealing with an acute fever. And the toxicity—that "flat-outness" with eyes wide open as though staring at some devil—is in strong contrast to the remarkably negative post-mortem appearances. Where, you ask yourself, is the "gastro-enteritis" which killed this baby? Moreover, has not the severity of this mysterious "gastro-enteritis" in recent months marched cheek by jowl with an influenza-like disorder in adults and older children? I think it has. At any rate here is an illness quite other than the old-fashioned "summer diarrhoea" of infants, and one not likely to be overcome by anything less than a great combined operation.—I am, etc.,

The Grove Hospital, Tooting. J. B. ELLISON, M.D.

SIR,—The apparent success in the treatment of infantile gastro-enteritis with sulphaguanidine reported by Dr. J. L. Henderson (April 3, p. 410) is encouraging, but it is unfortunate that his clinical experiment was inadequately controlled. As we have already explained (March 27, p. 371) the mortality from this disease depends to a large extent on the severity of the infection. This varies enormously in different epidemics. It is difficult to estimate accurately the severity of the disease; therefore it is most important when assessing the value of an individual treatment to use an equal number of controls, preferably only giving alternate cases the specific remedy, the remainder of the treatment being standardized. Only under these conditions can a comparative assessment of various treatments be formulated and ultimate progress in the prophylaxis and treatment of gastro-enteritis be made.—We are, etc.,

C. ELAINE FIELD.
W. G. WYLLIE.

London.

Flavines as Surface Antiseptics: Influence on Healing

SIR,—We regret that Prof. C. H. Browning should have concluded his opportune review of the aminoacridines (flavines) as surface antiseptics (March 20, p. 341) by authoritatively perpetuating the opinion that "retardation of granulation and healing tends to follow continued use of the flavines"; and this despite and contrary to the cited findings of his co-workers (1922). He also states that "Bennett did not experience it in over 600 cases. In tissues from this series Blacklock found mitoses of various cell types at levels of 1/50 to 1/5 mm. below the actual growing surface."

This prompts us briefly to restate here our conclusions *qua* proflavine and the rate of healing, based on our observations and measurements during the last three years on the continuous use of depots of proflavine in occlusive emollient dressings for treating infected granulating areas—burns (*Lancet*, 1942, **2**, 527). These depot dressings permit of a free and steady diffusion of antiseptic dyestuff in optimum and slowly diminishing amount, and replace entirely the useless *B.P.C.* acriflavine emulsion, in the cera alba of which the acriflavine is almost completely immobilized (*Lancet*, 1942, **1**, 347). The initial concentration of proflavine yielded by the depot dressing is about 1/500, slightly more than half the maximum concentration in serum, 1/300, obtaining in the wounds treated by Mitchell and Buttle, who used proflavine powder; the concentration available from depot dressings after 4 to 8 days' application varies from 1/5,000 to 1/20,000 and 1/2,000 to 1/4,000, according as the proflavine is in the water phase of a buffered (*p*H 6.2) isotonic oil-in-water emulsion or in an oily preparation of proflavine oleate in liquid paraffin and petroleum jelly (*Lancet*, 1942, **1**, 347; 1943, **1**, 159).

Using these depot dressings for infected granulating 2nd and 3rd degree burns and changing them at intervals of 4 to 8 days:

1. "All cases treated with proflavine sulphate have healed within what are to be regarded as 'normal limits'—that is, within average times ascertained from parallel observations and measurements in comparable, non-infected cases of burns treated by tannic acid and gentian violet coagulation methods."

2nd-degree Burns of Foot and Leg

Non-infected Control.—Tannic acid "tan" separated 30th day. Area burned 367 sq. cm. Overall rate of healing (injury—epithelization): 0.815 sq. mm. per mm. circumference per day.

Infected Case.—Area 431 sq. cm. Epithelized 26th day. Proflavine-urea o/w emulsion 19 days, 4 changes. Overall rate of healing 0.85 sq. mm. per mm. circumference per day (injury—epithelization, including infected period).

2. Proflavine does not inhibit fibroblastic activity and epithelization in the healing of large granulating areas where the rate of healing is great. Thus in areas of the size of a sheet of foolscap paper, when infection is terminated by proflavine, the healing edge

may advance inwards at the remarkable rate of 0.5 cm. per day, *under continued proflavine applications.*

2nd-degree Burns of Arm and Forearm (Infected)

A.—Area 636 sq. cm. Epithelized 26th day from injury. Proflavine–urea o/w emulsion 14 days, 3 changes. Rate: 5 sq. mm. per mm. circumference per day.

B.—Area 534 sq. cm. Epithelized 32nd day from injury. Proflavine oleate–petroleum jelly 27 days, 4 changes. Rate: 4.2 sq. mm. per mm. circumference per day.

3. Proflavine sulphate has no inhibitory influence on fibroblastic activity in exuberant granulations resulting from simultaneous hyperosmotic action of urea 5%. Thus in Case 5 (*Lancet*, 1942, **1**, 347) granulations were exuberant even in the 6th week of application of proflavine–urea emulsion.

All our dressings have been of an emollient nature and changed only at intervals of 4 to 8 days or longer. This is essential for the preservation of recently healed tissue. The daily or twice-daily changing of wet dressings become dried destroys newly formed tissue and delays healing If such wet dressings must be employed in granulating wounds they should be wetted with warm normal saline before removal. As well as preserving new-grown tissue, this minimizes the air-borne dissemination of organisms from exudate in the wound and in the dressings (unpublished work).

We would add that our experience is in agreement with Prof. Browning's final point on the capacity of flavines in practice to prevent or control infection, for while one initial treatment with acriflavine 1/1,000 may prevent infection in burns treated with tannic acid for 2 to 7 days, as compared with 5 to 10 days after mercury perchloride 1/5,000 (*Lancet*, 1942, **2**, 664), proflavine depot dressings have completed and maintained the sterility of granulating areas moderately infected previously. This experience led us to commend the use of proflavine depot dressings in first-aid measures for the numerous 2nd-degree burns of mobile warfare, to cover the 2- to 4-day period of evacuation, and thus prevent the high (90%) incidence of infection and the consequent delay in healing in such casualties (*Lancet*, 1943, **1**, 159).—We are, etc.,

R. M. HEGGIE.
J. F. HEGGIE.

Vitamins and Physical Efficiency

SIR,—In his letter (March 27, p. 394) dealing with the subject of our paper Sir Adolphe Abrahams stresses the difference between his experience and ours. We are not surprised at this. (1) The subjects we dealt with were healthy young men already selected by the Services after making their own tests. They were not record-breaking athletes, highly trained for some particular test of athletic performance. (2) Sir Adolphe quotes only "general experience" as his evidence, whereas we think it clear from our results that the differences we observed in the two groups with and without vitamin supplements would have been revealed only by careful statistical examination.

The R.A.F. breath-holding and endurance tests are designed not to measure ability to perform specialized muscular exercise but to afford indications of the stability of the respiratory and circulatory centres and the resolution and general power of endurance of the subject (H. G. Armstrong, *Principles and Practice of Aviation Medicine*, p. 47). Sir Adolphe expresses dissatisfaction with the records of these tests in our paper on the ground that our subjects averaged practically a minute in the endurance test at their first examination, whereas he has no record of any man exceeding 50 seconds in this test, and has examined athletes who "faded out at 20 to 25 seconds." Since "the average time in a large number of cases tested is between 50 and 60 seconds" (Wing Cmdr. T. S. Rippon, *British Encyclopaedia of Medical Practice*, **2**, 229), it would seem that it is Sir Adolphe's rather than our results which require justification and explanation.

We should like to stress that on the basis of our work we could not recommend the administration of vitamins to all would-be champions in the hope that they may become real ones. That achievement depends on many other things besides the general state of nutrition. Finally, Sir Adolphe is not able to accept the significance of the results on the resting pulse rate. We can but repeat that statistical examination is the only way to reveal whether such differences are significant. In a single person examined at different times and under different conditions it is possible that a variation of 10 beats per minute is within normal limits. But such variations occur in only a few of the subjects in our groups, and it is the uniformity of the changes of the remaining individuals in each group which really establishes the significance of the result by reducing the probable error of the mean change.—We are, etc.,

A. A. HARPER. H. S. RAPER.
The University, Manchester. IAN F. S. MACKAY. G. L. CAMM.

The Word "Rehabilitation"

SIR,—The word "rehabilitation" is subjected to much abuse in both medicine and law. I would attempt to define it. The rehabilitation of an injured or sick workman may be effected in three distinct ways: by prosthetic measures, by resettlement, and by reconditioning.

Prosthesis: where some extraneous, artificial aid is needed. This strictly applies to artificial limbs, etc., but it is no abuse of the term to include such things as spinal jackets, spring trusses, and pattened boots.

Resettlement: where ability to resume the regular trade or occupation is outside the bounds of reasonable probability. This applies to such medical states as heart disease, advanced phthisis, etc., and to any surgical condition where prosthesis is impossible or very inadequate—i.e., where there is a substantial measure of permanent incapacity.

Reconditioning: where resumption of suitable modified work is desirable or essential to secure a full or substantial measure of recovery. This applies to the majority of the Workmen's Compensation Act cases.

In my experience, the word "rehabilitation" has come to have such a laxity of definition that it now possesses no concise scientific or legal meaning. I would suggest that its use be discarded in industrial medicine and all medico-legal work, and that the three words (prosthesis, resettlement, and reconditioning) be substituted so as clearly to convey which form of rehabilitation the writer has in mind. Perhaps a discussion on this matter in your columns would give rise to an even better nomenclature.—I am, etc.,

Manchester. JOHN D. BYRD.

Staffing of Miniature Mass Radiography Units

SIR,—I feel indebted to Dr. J. V. Sparks for his observations (March 27, p. 398) and for endorsing some of my suggestions that have appeared previously in these columns. We seem to share agreement on most points.

One aspect of this subject, however, has not been fully considered (except for a short reference I made to it at a recent meeting of the Royal Society of Medicine), and that is the role of the "static" or stationary unit as compared with the use of the motor mobile portable unit in miniature mass radiography. When stationary units are employed the patient must travel to the examination centre and back again to his work. Distances must vary and the loss of time from work accordingly, while the necessary transport for these workers will further tax the public services, already overtaxed. Assuming that one *x*-ray unit carries out 5,000 examinations per week and that only 30 of these units are operating throughout the country: allowing 30 passengers to a bus for a double journey to and from the centre, then some 10,000 bus loads per week will be proceeding throughout the country to cope with this new form of medical examination. As time goes on this figure must increase, and sooner or later business firms may complain of the loss of man-hours, while the question of feeding these workers while away from work will arise; and who pays for the transport? During the war numerous new factories have sprung into being, situated over the countryside and often long distances from towns, which may mean that travelling to and from the centre will occupy the best part of a day or more.

It seems to me, as I have previously indicated in these columns (Aug. 29, 1940), that the solution will eventually prove to be the motor mobile portable miniature mass radiographic unit. The first of these units, which I had constructed through the British Red Cross, in 1939, was eventually presented to the R.A.F. Medical Service, where it has done much useful work. This unit, however, was essentially an experimental one, and subsequent models are greatly advanced. The features and performance of the mobile portable unit as compared with the static unit are practically identical, except that the

mobile units possess a distinct advantage in a shorter exposure time for making the actual *x*-ray exposure. This has been achieved by increasing the electrical cycles to the neighbourhood of 100, instead of retaining the customary 50 to 60 cycles which predominate on the average electrical mains. The power for the mobile unit is derived from a rotary coupled by a special fitting to the car engine, and the power led by a long cable, fed from a rotating drum (on the side of the car) to the *x*-ray unit, which has been assembled in the factory, office, or other place on the premises where the examinations are to be carried out. The *x*-ray tubes, the camera, lens, and transformer are the same on the mobile portable unit as on the static unit. The remainder of the machine, however, is constructed lightly and in sections, which permits rapid assembly or dismantling in a few minutes. The inside of the van is constructed as a dark-room to carry out development of full-size *x*-ray films or for miniature radiography work. Enough space is left in the centre of the van to load the portable unit and so transport it to the required destination. On arrival it is unloaded and quickly assembled in the factory or on the site of operation. The examinations are not carried out in the motor van itself, and thus the patients are not exposed to the rigors of the British winter, which they might be if they had to pass from the building to the van and back again.

In brief, we bring "the mountain to Mohammed," and what a saving of time, transport, man-hours, and money a fleet of these cars would effect if they were sent out into the country to visit the factories, warehouses, and stores instead of the masses of workers that will travel about the country in 10,000 bus loads a week under the present scheme for static machines! Further, the use of motor mobile portable units must be apparent for the examination of troops in outlying districts, civil population in rural areas, or in such places as the prairie provinces of Canada. While the present policy of the Ministry favours static machines, I feel convinced that before this new branch of work is much older this policy will be revised and the mobile units come into their own. Also for the static units that do have their place in the scheme, a much vaster organization will become necessary with specially designed centres, with large dressing halls on either side of the examination room capable of coping with hundreds of people at one time and permitting a properly organized one-way traffic system, so keeping the units properly fed with patients. These departments will also embrace all the customary conveniences Dr. Sparks has referred to (March 27, p. 398), reporting rooms, storage, and an extensive filing system.

I would welcome any criticism, destructive or constructive, concerning the use of the motor mobile portable miniature mass radiographic unit.—I am, etc.,

London, W.1. NORMAN P. HENDERSON.

Appointments System at Fracture Clinic

SIR,—Mr. F. S. A. Doran's article on out-patient organization (April 3, p. 420) describing the appointments system employed in the fracture clinic at Manchester Royal Infirmary is most interesting; I know from personal experience at that clinic that the system works well in practice. I would criticize the following two points in it, however.

Although return cases are not kept waiting, new patients are kept waiting until 2 p.m. suffering from apprehension if not also from some degree of pain for the whole of the morning. The appointments record demands the co-operation of a clerk and the surgeon, and "the time, day, and date must all be written on the patient's appointment card." In spite of all these precautions one in every five patients fails to keep his appointment.

At the fracture clinic at the Glasgow Royal Infirmary over 7,000 new cases are now being treated each year. Most of the cases are fractures, dislocations, or sprains, and therefore the patients have to make subsequent attendances. The medical staff consists of a surgeon, first assistant, second assistant, and two house-surgeons, and the clerical staff of one secretary and one shorthand-typist: all are full time. On his first visit the patient is given his attendance card, which states that on subsequent visits he must attend at 10 a.m. (A–H); 11 a.m. (I–Mc); noon (M–Z). The letters refer to the initial of the patient's surname, and the two inappropriate times are deleted. For this area of Scotland such a division spaces patients equally throughout the morning, and each patient is automatically given an appointment as regards the hour for all subsequent attendances.

The case notes are filed in three cabinets, and so if the clerk has to go into cabinet 1 for an 11 a.m. patient she can reprimand him for having come late. Afternoon appointments are only made for special cases. As regards the day of subsequent attendance, the doctor seeing the case decides this and tells the patient: at the same time he marks it at the end of his notes as so many days hence—e.g., 7 indicates that the patient should report back in a week. At regular intervals the files are examined and all non-return cases weeded out; if necessary the department's almoner investigates the reason for the patient's absence. Most new cases arrive at 9 a.m. and so 9 to 10 a.m. is reserved for dealing with them, but two of the doctors are always detailed to carry out the treatment of a new case as soon as an *x*-ray is available. I feel that it is wrong to have to consider an appointments system for new cases as Mr. Doran suggests. So far as possible patients with different classes of fractures are asked to return on different days of the week. These groups of fractures are arranged so as to equalize the number of return cases each day.

By using this automatic system of appointments based on averages most patients are seen within half an hour, and no patient is kept waiting for more than an hour, and the cost in time and energy of the medical and clerical staff is reduced to a minimum. In practice the number of patients attending at the wrong time is certainly not more than the 20% which is the figure given for the Manchester Royal Infirmary fracture clinic. The greatest difficulty is in getting patients from a distance to complete their attendances. About 3,000 of our cases come from Lanarkshire, and the only way in which we have got over this difficulty has been to transport a mobile team and the patients' records to a local clinic which we have opened in Motherwell, the central town in the area of Lanarkshire served by this hospital.—I am, etc.,

Glasgow Royal Infirmary. JAMES PATRICK.

SIR,—Mr. Doran, in his article on the out-patient organization of the fracture clinic at the Manchester Infirmary, shows how an appointments scheme can be applied in the case of old patients attending a department dealing with about 2,500 patients a year.

At Guy's Hospital for the last fifteen months an appointments system for all patients, both new and old, has been in force in the out-patient department, which dealt with 75,000 cases in 1942. So far as new cases are concerned, the patient or his doctor may book an appointment by personal visit, by letter, or by telephone to the sister-in-charge of the out-patient department. Old patients at each visit book appointments for their next attendance. Appointments are made in hourly blocks, one batch of patients attending, say, between 9.30 and 10.30 a.m. and the next between 10.30 and 11.30 a.m., so that no patient should have to wait longer than an hour before seeing the doctor, and some may see him within a quarter of an hour of their arrival. The number of patients booked for each hour varies in different clinics and was determined by analysis of the previous habits of each clinic.

Mr. Doran seems to express some doubt as to whether teaching can be undertaken in clinics which have adopted an appointments scheme. But his scheme aims at seeing patients at the rate of 15 to 20 every half-hour; obviously this does not permit teaching. In our scheme the number of appointments made per hour for the members of the teaching staff, both senior and junior, is considerably less than those made, for instance, for the house officers. We have not found that teaching renders the appointments scheme impracticable, and on the whole it has actually been of benefit to the teachers.

Our experience has been that the appointments scheme presents more advantages than objections. It certainly succeeds in its main object of curtailing the period of waiting. It represents an attempt to increase the efficiency of the out-patient department. It gives the patient the desirable impression that he is an individual and not one of a crowd. It relieves congestion in the out-patient hall. It permits the nurse to prepare more efficiently for the management of the session. It allows alterations in the out-patient time-table, unfortunately

occasionally necessary in these difficult days, to be made at very short notice. It makes it possible to restrict the number of cases seen at any one session, and therefore assists a member of the visiting staff to plan his day with reasonable accuracy.—I am, etc.,

Guy's Hospital, S.E.1. P. M. F. BISHOP, Deputy Superintendent.

Trichlorethylene Anaesthesia

SIR,—I read the two papers on trichlorethylene anaesthesia (March 27, p. 380) with great interest, as I have been using this agent for some time, both for routine work and for maxillo-facial and neurosurgical cases. While my own observations agree to a large extent with those made by Drs. Gordon, Shackleton, Howarth, and Duff, I do not think their conclusions do justice to a valuable and relatively harmless anaesthetic agent.

Of the cases quoted by Drs. Gordon and Shackleton 76% were intubated, and it seems at least possible that many of the cardiac irregularities reported may have been caused (or aggravated) by the presence of the tube in the trachea while the patient was in a light stage of anaesthesia. It has been conclusively demonstrated by Reid and Brace (*Surg. Gynec. Obstet.*, 1940, **70,** 157) that the insertion or removal of an endotracheal tube under light anaesthesia frequently gives rise to auricular and ventricular extrasystoles, with delayed conduction time and slowing of the heart, probably due to reflexes from the upper respiratory tract to the heart.

As anaesthetist to an E.M.S. maxillo-facial clinic, I consider that the original technique of Magill has yet to be surpassed. This consists of nitrous oxide and oxygen, with or without carbon dioxide absorption, and supplemented by a minimal amount of warmed ether vapour administered by the drip-feed method. For those cases in which diathermy is used, or when for other reasons ether is contraindicated, trichlorethylene is used to supplement the nitrous oxide–oxygen with excellent results. Although many patients can be intubated without difficulty, better results are obtained in the robust "Service" type of patient by preliminary induction with pentothal–nitrous oxide–oxygen–ether until the patient is well established in the third or surgical stage of anaesthesia. As in the case of chloroform, this procedure eliminates the "dangerous" period of light anaesthesia when cardiac irregularities are liable to occur. Subsequent anaesthesia may be maintained by trichlorethylene, so that by the end of the average plastic operation the ether will have been eliminated from the patient's system.

It is true that trichlorethylene does occasionally give rise to various forms of cardiac irregularity, but with suitable precautions and technique this complication should not be unduly prominent. During the past nine months I have administered trichlorethylene to about eighty patients undergoing operation for brain tumour, trigeminal neuralgia, and other neurosurgical affections. Although nearly all these patients were induced and intubated without ether, cardiac irregularities have been observed in only six cases, three of which were classified as bad risks before operation. All cases undergoing intracranial operations were anaesthetized by the open T-piece technique which I described some years ago (*Lancet*, 1937, **1,** 561). Anaesthesia is maintained in the first plane of the third stage for long periods up to six hours, and the results have been so satisfactory that trichlorethylene is now used as a routine for neurosurgical operations. After induction and intubation the nitrous oxide is set at 2 to 4 litres and the oxygen at 2 litres a minute, the gases being passed over the surface of the trichlorethylene; when the bone-flap has been turned down, the nitrous oxide is usually discontinued and the oxygen flow increased to 4 litres a minute. With the T-piece technique a certain proportion of air is admitted to the circuit, which may account for the fact that the respiratory rate rarely rises above 25 to 30 a minute. About 1½ to 2 ounces of trichlorethylene is used during an operation lasting four hours, and, not infrequently, the patient is able to answer questions when the endotracheal tube is removed at the end of the operation.

While no one would suggest that trichlorethylene is a universal anaesthetic agent, nevertheless it is a most useful one for suitable cases, especially in the presence of the diathermy or thermocautery. In my opinion it should not be administered when gross toxaemia or cardiac irregularities are known to be present, or to very young children; nor should it be used if there is a marked and progressive rise in the rate of respiration during operation.

By the way, can anybody tell me why the respiratory rate increases during trichlorethylene anaesthesia?—I am, etc.,

Newcastle-upon-Tyne. PHILIP AYRE.

Peptic Ulcer a Deficiency Disease?

SIR,—As a contribution to Dr. J. J. O'Mullane's view (March 6, p. 302) on the subject of peptic ulcer as a deficiency disease may I report on two cases of my own. They concern two female patients, aged 19 and 25 respectively, under my care early in 1937 in Vienna, who suffered from gastric ulcer, confirmed by *x*-ray examination, and whose histories were very alike. Neither of them responded to the usual treatment, for in spite of rest in bed, strict diet, etc., for many months they kept on having pain after food, and occult blood in faeces. In the course of their illness they developed classical signs of scurvy. Put on vitamin C, in addition to ample lemon and orange juice, not only did the scurvy clear up completely after four weeks but there was a remarkable improvement of the gastric condition as well; and kept on the vitamin for another six weeks they made a perfect recovery from the ulcer. Radiographs taken a few months later showed no pathological changes.

Whether the scurvy was due to the diet—the liberal Meulengracht diet not yet being adopted, and the ulcer diet at that time being not only insufficient in calories but deficient in, almost devoid of, vitamins—or whether the ulcer itself was the result of vitamin deficiency (the girls came from working-class families, for years unemployed and their food conditions poor) I leave undecided. But the striking effect of the vitamin therapy in those two cases, the definite, although less dramatic, improvement in other cases of gastric ulcers which I had to deal with subsequently, and, further, the clinical experience that both acute and chronic ulcers are more frequently met with during spring, when vitamin-containing foods are getting scarce, strongly suggest a connexion between peptic ulcer and deficiency of vitamin, probably vitamin C.

If we regard the peptic ulcer as a disproportion between acid production and resistance of the stomach mucosa, it might be supposed that lack of vitamin presents one of the factors which leads to devitalization and eventually to digestion of the mucosa. Vitamin deficiency may also be the explanation of the well-known fact that although the single defect may heal up, or at least be reduced to a state of latency, yet the tendency to recurrence—the "ulcus diathesis," as H. Strauss puts it—remains.—I am, etc.,

Manchester. B. KOHN.

Houses to Live In

SIR,—I am wondering if it may not be in proper place for me to comment on the article in your *Journal* entitled "Houses to Live In" (Jan. 30, p. 136). I have thought a great deal about the inadequacy of houses constructed during my lifetime. Over large portions of the United States they are hideous and, in many respects, unsuitable for the usual domestic arrangements. However, we have succeeded, in the last decade at least, and are succeeding in a larger degree to-day, in building successfully designed dwellings.

There is almost nothing in your comment on the memorandum of the Royal College of Physicians which would indicate that a suitable dwelling had been recommended, or indeed could be constructed from the outline given in your columns. Why, for instance, should communication between the bathroom and bedroom be forbidden? In this country the bathroom at the end of the hallway belongs to the Dark Ages. One bathroom should be placed between every two bedrooms. If a maid's room is constructed it should have, as it does in the United States, a separate private bath; if the maid lives out, there should be at least a toilet and wash bowl off the kitchen. The cost of bathroom installations in this country is so low that it need not be considered an obstacle in correct planning.

Nothing in your editorial indicates adequate planning as to convenient arrangements for housekeeping even should it envisage a standard of living compatible with a very low wage.

Nothing is said about the durability of construction materials, particularly finishing materials, and their relation to sanitary arrangements and attractiveness. Why should there be a discussion about a dustbin? In this country I don't think we know what it is. Is central heating never coming to the English dwelling? The comments about housing for "the dirty and the anti-social" sound primitive. Why not either exclude them from communities where decent standards prevail or let education and the attitude of their neighbours contribute to making them more desirable tenants?

The College's three-story house brings up an unsavoury and unattractive picture. It seems too bad that the members of the College could not visit the United States and see some of the community dwellings which have been constructed over the past several decades by various philanthropic foundations and more recently by the Government itself. They provide separate dwellings in attractive style and with well-considered household arrangements, the buildings being "hooked up" so as to give some of the constructional advantage of a multiple dwelling.

The contrast between the sanitary arrangements now available in Europe, or even considered possible in Europe, and the everyday accommodations in this country needs to be remedied. I remember how astonished a British lady of distinction was several years ago to find that she could take a bath in the bathroom adjacent to her bedroom where she was a guest without having to make way for the next bather. To her it was unheard of that in a multiple-room dwelling there should be a bathroom with every bedroom.—I am, etc.,

New York. H. SIDNEY NEWCOMER, M.D.

What of the Patient?

SIR,—In the letters that you have so far published about the future of medicine in this country I have seen very little that deals with the part the patient will have to play. A comprehensive health scheme is much more than a matter of professional organization and free choice of doctor. The sick and the potentially sick will come into quite a different relationship with the State once any such service is initiated. It is most unlikely that the State will waste money on the treatment of conditions caused by gross neglect or deliberate ignorance. Clearly the patient will have to "toe the line" quite as much as will the medical profession.

While the free choice of doctor might conceivably be kept, the choice will have to be confined to a registered practitioner and the unorthodox will have to go out of business. The scheme will be made into a farce if the organization of the medical profession merely results in a gross increase in the number of "quacks." Self-medication and the scandals of the patent medicine business will have to be dealt with, for if anyone needs medicine he should get it through the doctor and the Government pharmacist. Treatment of socially dangerous diseases will have to be made compulsory. Many more positive steps will have to be taken to prevent ill-health. It should be a serious offence for parents to neglect to give a child pure milk in adequate amounts or to neglect to give vitamin supplements or such other substances as are deemed necessary. The disgustingly filthy houses that one sees, and not all in the poorer parts of towns and cities, must be cleaned up and kept clean. The laws relating to the supply of foods and drink will have to be tightened up. All these, and many other points that will readily occur to medical men, have their place in any real plan for the future health of this country.

Further, as measures of more immediate import, the whole field of animal research and of prevention of disease by vaccines and sera will have to be reviewed. Inoculation against diphtheria and such other types of preventive treatment as wide experience shows to be desirable will have to be made compulsory. This will raise opposition, but I think that this should be met with now. Illness that is preventable must be prevented, otherwise the idea of raising the standard of health of the country becomes a mockery.

There are many doctors who fear that the only result of the agitation that is now going on will be the coercion of the medical profession and its organization into a State-controlled body that will then be expected to do wonders in improving the health of the people. What is the public going to do as its share of this great work? There will be great changes in the habits of the people when these plans are brought to fruition, and it is time that this was brought to the attention of the general public.—I am, etc.,

Bristol. J. N. P. DAVIES, M.B., Ch.B.

Artificial Respiration

SIR,—The knowledge of physics required by the medical curriculum is admittedly elementary, but it is distressing that so many of our profession have forgotten even the rudiments of the subject. In artificial or any other respiration the force with which we are dealing is atmospheric pressure. This force, a result of gravity, differs from its parent in that it is exerted in all directions.

In respiration the problem is not to get air into the lungs—atmospheric pressure does that—but to get it out. Eve's method uses the effect of gravity, in moving the liver and spleen (total 36 lb.) down an inclined plane, to push the air out of the lungs. Schafer calls for compression of the abdomen to force the diaphragm into the thorax. The actual measure of efficiency is the volume of tidal air produced in a moribund body. Eve's method demands at least a plank and a fulcrum; it cannot be used at low tide on the Solway: Schafer's can.—I am, etc.,

E. J. THOMSON.

Scientific Freedom and Social Medicine

SIR,—Mr. Somerville Hastings (March 27, p. 392) has misunderstood my paper. He has assumed that it is an attack upon State medicine, and, in defence, he has rallied a rather unrelated mixture of statements, opinions, and criticisms. I attempted to demonstrate, by analysis, that the medical superintendent system is unsatisfactory as compared with that of management of a hospital by a properly constituted medical committee. The prospect of State medicine raises this issue to a position of paramount importance, and it is essential that medical men be made aware of the bad points of an autocratic system and of the danger of instituting it.

Mr. Somerville Hastings has therefore been belabouring the wind, and I must apologize to him for having caused such a waste of his energy. In so far as he touches upon the question of the control of medical affairs within the hospital, he makes no defence of the medical superintendent system, and brings forward no argument against government by committee. He pleads for specific examples of bad superintendents, but I am sure that he, as a Socialist, would not base his rejection of the principle of absolute monarchy entirely upon the examples of Nero, James II, and their like. He cites the great improvement of the L.C.C. hospitals, which I heartily endorse, but again I cannot follow his train of argument. I seem to remember British reactionaries praising the punctuality of the Italian railways under Fascism. The logic is parallel.

In plain fact, the medical superintendent in council and municipal hospitals has absolute power as regards medical affairs, as well as administratively. Mr. Hastings's statement that "the work of junior medical officers in municipal hospitals is under a degree of supervision and even control by senior officers" is a tribute to his belief in human benevolence, but is misleading. In fact, every medical officer, junior and senior, in every council and municipal hospital is under the complete autocratic control of one man—the medical superintendent. The superintendent can impose treatment upon, or withhold treatment from, the patients who are under the direct care of the other medical men in his hospital. He can remove patients from any wards, and, if he has surgical aspirations, submit them to any form of specialist surgical procedure at his own hands, remaining above all criticism respecting the results. Should a junior desire to write an M.D. thesis, access to cases may be made conditional upon his consent to bracket the superintendent's name with his own in the event of publication. These things can all be done, and the nature of the system conceals them from the public and from the profession. But the sterilizing effect in an autocracy is produced less by the rare major misdeeds than by the minor misdemeanours, which are more frequent in proportion to their lack of sensationalism. So long as this state of things is confined to one small section of active medicine it matters little, but if the autocratic system were made universal under State medicine the result would be sterilizing to initiative and to research.

Mr. Hastings thinks that there is freedom of scientific publication in a municipal service. I would like to refer him to the Standing Order 303 (Sections *a, b,* and *c*) of the London County Council. He will find that scientific papers have to be submitted to a higher authority, which will determine whether any question of policy is involved. Now, the central authority can define and impose the limits of policy, and the paper in question may well be one dealing with the details of medical or surgical treatment, blood transfusion, immunization, and so on *ad infinitum,* and a reversal of policy, even if it were beneficial to the patient, might throw discredit upon the lay or medical initiators of the policy. My view of politics is, perhaps, less roseate than that of Mr. Hastings, but I suspect that many men in authority rather dislike being proved wrong by their juniors, and this is especially true of politicians and of scientifically rusty administrators.

Mr. Hastings does believe that "at every hospital there should be a committee of the medical staff through which individual and collective viewpoints can be expressed and transmitted to the governing authority." He does not state whether he thinks that these committees should exist, like the present Reichstag, as emblems and gestures only or whether they are to be regarded as responsible bodies empowered to transmit the opinions of the staff as a whole to the lay power. If the progressive parties in the State do not quickly formulate their policy upon this matter, they will forfeit the support of a large mass of medical opinion which honestly desires to see the best possible medical treatment administered as widely as possible.

In conclusion, I would like to ask Mr. Hastings the following questions:

1. Does he believe in democracy in science—that is, in real unrestricted freedom of speech and criticism?
2. Is he in favour of retaining the autocratic power as regards medical affairs in the hands of the medical superintendent?
3. If medical committees are instituted, does he think that these should have local freedom to elect their own chairman and officers, and to express their opinions to their lay bodies without other intermediary?

If his official position makes it impossible for him to reply, I suggest that he ascertain the answers from his lay authority with their permission to make them public. Failure to do this will carry its own implication. Medical men throughout the country should ask similar questions of the municipal bodies and councils with which they are or may be concerned.—I am, etc.,

London, W.1. GEOFFREY BOURNE.

SIR,—Having, with but four years' break, been in the service of the Council or its predecessors since 1908 I write to endorse what Mr. Somerville Hastings (March 27, p. 392) says of the improvement in the general hospitals of the L.C.C. since April 1, 1930. That they can learn from the voluntary hospitals I agree, but I am also confident that voluntary hospitals could learn from them.

The suggestion that some hospital is "run exclusively for the benefit of the doctors or its staff" has previously only been made in jest or in pique, usually by a tired surgeon in reference to the nurses when all the theatre staff have been changed on one day, but this is the first time I have ever heard it suggested that the administration of any hospital should be under its medical staff. Either there is a hospital board to which two or more members of the medical staff may be appointed or, as at Guy's, the staff form a medical committee which acts as the advisory body to the Governors in all expert matters affecting the care of the patients, but has no say in the general administration, including finance, works, supplies, intercommunication, and the nursing, radiographic, and massage departments and schools. There may be different views as to how a hospital should be run—and I believe there is room for two systems competing in friendly harmony, and each doing the work suited to it—but everyone conscientiously thinks that what he does is in the interest of the sick. Even the traditional tyrannical medical superintendents believe this; but shall we gain anything by producing concrete examples of their failings? Had we not better thresh the matter out on principle and so avoid the bickerings of personalities, while setting up an organization that will prevent such a man making the life of everyone in the place miserable when he gets into power? We cannot prevent one such being appointed from time to time. We do not know enough about the psychology of the power complex. Its possessor may not know he has it, or it may not enter into him until he attains to the position where he can use it. Alternatively, he may so mask his true nature from those appointed to appoint him that they think they have made an excellent selection, though all who have previously worked with him shiver at the announcement. No doubt concrete examples will be forthcoming if they must, but Mr. Somerville Hastings will be the last man in the medical profession to hear of them because of the political post that he holds.

There is a principle well recognized in the fighting Services, and we need to make sure of it in the civilian medical services as they develop. It is based upon the rule of English justice that anyone is entitled to be judged by his peers. A sailor is tried by a sailor, a lawyer by a lawyer, and a doctor by a doctor in all matters of professional behaviour. Let us apply that principle to Mr. Somerville Hastings. He is the chairman of the Hospital and Medical Services Committee of the L.C.C., but he holds that post as a politician and not as a doctor, and the last person to whom we want our professional differences to go is a politician. If concrete cases are needed they will be asked for by those appointed to make the "further immediate investigation" (Beveridge report, para. 437), the organization for which is at present being set up, but if the whole matter can be settled on first principles so much the better.—I am, etc.,

Guy's Hospital, S.E.1. T. B. LAYTON.

SIR,—There are few who will disagree with Dr. Geoffrey Bourne's resolutions regarding a State hospital service (Feb. 20, p. 227), but some of his arguments reveal a point of view which, I think, cannot go unchallenged.

He says: "Doctors have, or should have, as their only professional objects the provision of the best possible preventive measures against disease, the best possible administration of treatment, and the most rapid improvements possible in the technique of treatment. They are concerned greatly in the facilities given them for this purpose and demand that they shall be the best procurable, but *care little by what machinery these facilities are paid for.*" (The italics are mine.) If this last-quoted sentence is true it indicates a peculiar gap in the mental horizon of doctors. The machinery by which payment is made profoundly affects the relationship between doctor and patient, and has a bearing on the standard and type of treatment received, or may even determine whether a patient is treated or not. Even if the statement were true about most doctors (which is very doubtful), it is certain that the leaders of the profession care a great deal by what machinery the facilities they supply to the wealthy patient are paid for.

The attitude towards patients is different in voluntary and municipal hospitals, precisely because treatment is paid for in different ways. A voluntary hospital is provided *for* the patient, but not necessarily *by* him. Expressed somewhat crudely the attitude taken by the hospital towards him is, "Take it or leave it." The hospital is run, not as Dr. Bourne says by a democracy, but by an oligarchy, whether intentionally or not and however "democratic" the leaders may appear to be towards their juniors. This is partly due to the high professional (and often social) position of these leaders. It results in patients being regarded as "good cases," "opportunities for practice," "means of building a reputation," or "material for research"—a statement which casts no slur on the efficiency or humaneness of the treatment they receive individually. It means that selection of cases can be exercised for teaching or research purposes or for reasons of personal interest.

A municipal hospital is owned by the patients. They pay for its construction, upkeep, staffing, and management, so they cannot be regarded in quite the same way. They can demand treatment there, and the staff, as a whole, cannot exercise selection. This system has involved the establishment of medical superintendents, who are placed in a very responsible position between the patients and the lay committees, to whom complaints are reported. This is why a medical superintendent feels that he must have some control over any scientific work done in his hospital; the "material" for such work is not

only paying for it, but is the owner of the means by which it is done. Similarly, the remark of a lay member, quoted by Dr. Bourne, to the effect that "I will not have *my* people taught upon for the benefit of medical students," simply indicates an acute consciousness of the position of the patient in the system.

Looking at the matter historically I cannot see any way by which the magnificent series of publicly owned hospitals, exemplified by those of London and Middlesex, could have been brought to their present standard of efficiency except by perpetuating for a time the already existing machinery. It could not have been effected by transferring the "voluntary" type of oligarchy to the municipal hospital, because the method of working would not have fitted in with the rate-paying system.

But if the modern medical superintendent is the natural successor to the one who "ran" the infirmary, he is usually a very different type of person. Many superintendents have been doing first-rate clinical work, besides performing their arduous administrative duties, and in addition to their efforts in building up efficient hospitals and staffs. I have no experience of L.C.C. hospitals, but, having attended staff meetings at a Middlesex county hospital every week for the last 3 years, I can assure Dr. Bourne that he is wrong in saying that these meetings were "a great concession," started in order to "divert criticism," that they are "devoid of power" and have "no power of initiation." Proposals from members of the staff at these meetings are, where possible, carried out or attempted, and on occasions the medical superintendent is overruled, either by force of numbers or by a single authoritative voice.

I should like further to draw Dr. Bourne's attention to the fact that the Middlesex county hospitals have had for some years a flourishing medical society. This body has recently formed a research committee, which is at the moment making plans for the co-ordination of clinical research within the Middlesex county hospitals. The initiative for this enterprise has come from the medical officers forming the society and has in no sense been "dictated" from above; it has, however, received the warm support and encouragement of the medical superintendents of the several hospitals. It is a free movement within a socialized system and is to my mind indicative of the sort of team activity which is going to be a feature of the municipal hospital system. But I agree with Dr. Bourne that the "dictator" must disappear and the hospital system become democratic. In order to make it so, however, there must be removed from the present hotch-potch not only the dictator element of the municipal hospitals but also the oligarchy of the "voluntaries."—I am, etc.,

South Mimms. V. C. ROBINSON.

Anatomical Nomenclature

SIR,—In a well-known journal the reviewer of a book on surgical anatomy deplores the use in the book of the Birmingham anatomical nomenclature in preference to the old terminology. His justification seems to be that the latter is still the more generally known, and from that fact he argues that it is the more valuable in practice and therefore ought to survive. This attitude of mind to new developments has been manifest throughout the history of man, and has been one of the principal deterrents of the advance of scientific knowledge. Nearly all discoverers of new principles have had to run the gauntlet of criticism by those in whose minds was rooted the conviction that what they had been taught was correct, and who would not bestir themselves sufficiently to give serious consideration to the new ideas. In the same way the reception of the different changes in anatomical nomenclature has been hostile and even derisory in many quarters. These critics all have one thing in common, however, and that is that they have not troubled to study the newer terminologies. Had they done so, they would surely have recognized that each change represented an advance towards the rationalization and simplification of a difficult subject. The object of those concerned in making the changes has been progress, and the same can hardly be said of the rigid-minded critics.

Thus, the Basle nomenclature was introduced as an international one, and surely none can deny that such a step as its adoption was in the right direction, both to breaking down the nationalism which has been so largely responsible for the present world chaos and to the avoidance of having to learn a completely new anatomical terminology for every language in which medical works were read. But its Latin terms were cumbersome and difficult for most British medical men, and the Birmingham revision represented a further advance for British anatomy because it resulted in a more rational terminology which, for English-speaking people, was easier to learn and to remember. It is true that the names of the early describers of the different structures are absent from the modern terminology, but this is no bad thing. Such proper names, applied to anatomical structures, give no indication of the position or nature of the structures concerned, while the modern names in most cases are descriptive and are thus, so far as possible, an aid to memory instead of an additional burden on it. Medical students should have some knowledge of the history of medicine, and the pioneers should therefore be known to them not just as names, which in themselves signify nothing, but as personalities.

At the present day the unsatisfactory position exists that many students are taught the modern anatomical terminology during their anatomical studies, and yet when they begin to study clinical subjects they find that they cannot understand the terms used by their teachers and vice versa. Since the teachers are not prepared to change their terminology the students must, in their own interests, set about learning a completely new nomenclature just at the time when their memories are being taxed with the many and varied details of the clinical subjects. It seems likely that this handicap will be imposed on students until the clinical teaching is done by those who have been taught the new terminology and who realize its advantages over the old.

The same type of difficulty is encountered by the student in the use of weights and measures. In the pre-clinical years he is trained to use the rational and admirably simple metric system, and great is his confusion when, on reaching the clinical subjects, he is plunged into the intricacies of the curious and haphazard British system (if it can be called a system) of weights and measures. In this respect medical science is slow in following the lead of the other sciences in using the best form of expression, and it is for the teachers of medical subjects to cut short the time lag in the adoption of a rational system both of measure and of anatomical terminology.—I am, etc.,

University of St. Andrews. HERBERT HAXTON.

Venereal Diseases

SIR,—In your issue of March 13 your correspondent Dr. E. A. Chartres raises matters which are of vital importance to the health of the nation. At the V.D. Conference on Feb. 26 the fundamental issue of prevention by scientific means was carefully avoided by nearly all the speakers, while the practical application of prevention, such as that now being carried out by the Bournemouth Town Council, was not touched upon at all. The Archbishop left the matter in a position in which it cannot be allowed to remain, and the official policy of the Ministry must be challenged on the scientific aspect of the problem.

From the scientific point of view the position is amazing. The provision of additional sex education generally, and about V.D. in particular, is being urged, while all the time every opportunity is taken to prevent the scientific facts about prevention becoming known. Prevention is being prevented. The scientific research upon which V.D. prevention is based is as brilliant and as conclusive as any on record, and experience in the last war abundantly proved its reliability and added to our knowledge. Fanatical obstruction is such that it is demanded that this vitally important knowledge should be withheld from men and women. Although the Archbishop says, "an immense amount of sheer ignorance and error is to be dispelled," he deplores the spread of scientific truth about preventing V.D.

Fanatical opposition knows no limit. The Services are charged with "deliberate condonation of fornication" by giving instruction in the use of prophylactics. In other words, it is suggested that the responsible heads of the Services, knowing full well that venereal disease can be easily prevented, should deliberately fail to use that knowledge, and thereby allow

thousands of our young people to fall victims of the disease. By forbidding any mention or use of prophylactics these opponents would condemn "sinners" *unnecessarily* to grave physical injury, with probable spread to numerous innocent persons. Fortunately, our Services are run on more enlightened principles. These same opponents of prevention urge the provision of more and more clinics where the infected "sinners" can be cured at great expense to the community. In fact, their case boils down to a demand that "sinners" must run the risk of catching the disease, but, once infected, they must be given the advantage of scientific discovery in order to be cured. The use of other scientific discoveries which can and will prevent these diseases would not be allowed if such people had their way.

Properly organized and administered, a crusade against V.D. by scientific prevention could and would eliminate these foul scourges from our midst. Suitable posters and cards of simple directions for men and women have been prepared by the National Society for the Prevention of Venereal Disease, 47, Nottingham Place, W.1, and are now being circulated to all local authorities. In Bournemouth hundreds of these posters have been displayed, and thousands of cards with clear and concise instructions have been distributed by the Health Department. This is sound practical prevention.—I am, etc.,

R. A. LYSTER,
Chairman, N.S.P.V.D.

Bournemouth.

Irritant Spectacle Frames

SIR,—I believe I have made the acquaintance of a new form of allergy which may become fairly widespread. Two of my patients, who are, luckily, neighbours, have discussed with me their experience after obtaining new spectacle frames of wartime "tortoiseshell." Both have obtained their spectacles from the same optician within recent weeks. Both have noted intractable itching behind the ears, accompanied by serous discharge of considerable volume. Mrs. A. has also found a slight reaction on the bridge of the nose, while Mrs. B. has to-day a linear erythema across the temple, exactly where the sidepiece of the spectacles lies.

I write in the hope that this observation may help others.—I am, etc.,

H. THISTLETHWAITE.

Preserving Medical Freedom

SIR,—In view of the present interest in the question of hospital organization we thought it might interest your readers to know of the following resolution which was passed at the last meeting of the Medical Council of St. Bartholomew's Hospital. This resolution has been considered by the treasurer and governors of the hospital, who have expressed themselves in full agreement therewith.

"The Medical Council regards it as essential that freedom of expression in medical matters, freedom of speech, and freedom of medical practice in hospitals must be preserved in any post-war reconstruction and that a medical committee should be the advisory body to the governors of an institution on medical matters."

—We are, etc.,

REGINALD M. VICK,
Chairman.
F. C. W. CAPPS,
Hon. Secretary.

St. Bartholomew's Hospital.

The Services

Prob. Temp. Surg. Lieut. J. A. Oddie, R.N.V.R., has been awarded the D.S.C. for bravery and skill in the hazardous operations by which the Allied Forces were landed in North Africa.

NAVAL MEDICAL COMPASSIONATE FUND

A meeting of the subscribers to the above Fund will be held on April 30, at 3 p.m., at the Medical Department of the Navy, 64, St. James's Street, S.W., to elect six directors of the Fund.

CASUALTIES IN THE MEDICAL SERVICES

Died from the Effects of Wounds.—Capt. G. M. Calder, R.A.M.C.

Previously reported Missing since the Fall of Singapore, now officially reported Prisoner of War.—Major G. O. Gauld, R.A.M.C.

Obituary

E. W. G. MASTERMAN, M.D., F.R.C.S.

The death took place in Jerusalem on March 29 of Mr. E. W. G. Masterman, who both began and ended his career as a medical missionary in Palestine and Syria, but in his middle years served as medical superintendent at a London hospital and took a prominent part in the central work of the British Medical Association.

Ernest William Gurney Masterman was born on Jan. 2, 1867, the son of James William Masterman of Rotherfield Hall, Sussex. He derived his third Christian name from his mother's family. He was the elder brother of the Right Hon. C. F. G. Masterman, one of the principal builders of the national health insurance system and the first chairman of the Insurance Commission, whose functions were taken over by the Ministry of Health. Ernest Masterman was educated at Clifton College and at Monkton Combe School. He turned to a medical career only as incidental to a missionary one. He began his professional training at Edinburgh University in 1884, and in Edinburgh his ambition to be a missionary was reinforced by contact with C. T. Studd, the well-known evangelist. But family circumstances brought about an interruption in his studies, and for a time he became a schoolmaster. In 1887, however, he entered St. Bartholomew's Hospital, where he was Brackenbury surgical scholar, qualifying in 1891. In the following year he found his way out East, on appointment as assistant medical officer of the Jerusalem Hospital of the Church Missions to Jews. From that time onwards, for fifty years, the Holy Land was the great interest of his life. He worked at Jerusalem, Safed, and Damascus, and again at Jerusalem, until the outbreak of the war in 1914 caused his return to England. In 1916 he was given the charge of St. Giles's Hospital, Camberwell, now one of the L.C.C. hospitals, and served there until his retirement in 1933 under the age limit. He then returned to Palestine, this time under the aegis of the Church Missionary Society, and had charge of hospitals in Es Salt, Transjordan, and in Gaza and Hebron. At the age of seventy-one he was made medical superintendent of the 60th General Hospital in Palestine, and in 1939 he was appointed medical adviser for the Near East to the Church Missionary Society.

During his years in London Masterman identified himself with the work of the B.M.A. He attended every Annual Representative Meeting from 1920 to 1934. In 1931 he came on to the Central Council, of which he was a member for four years. He had previously done good service on the Public Health and Hospitals Committees, and he also served on a number of special committees, including one set up in connexion with the Indian Medical Service. In the Camberwell Division and the Metropolitan Counties Branch he also did good work. He was chairman of the Division in 1928-9, and, after serving for three years as joint honorary secretary of the Branch, he became its president in 1934-5. In all that he did he was a "good B.M.A. man,' and his common-sense counsel and special experience were highly valued. The subject of maternity services specially interested him, and in this field he served as a member of more than one committee. He had taken the Fellowship of the Royal College of Surgeons in 1892, a few years later he took the Cambridge D.P.H., and in 1909 the M.D. of Durham.

His interest in Palestine, its past and present, never slackened. For many years he was secretary of the Palestine Exploration Fund. To return to Jerusalem and be able to spend his closing years there in useful and happy activity gave him much satisfaction. For some time, however, he had been in failing health, and his son, who was serving in the R.A.M.C. in West Africa, was able, with Mrs. Masterman and other members of the family, to be with him at the end.

The following well-known medical men have recently died abroad: Dr. ALLEN GREENWOOD, emeritus professor of ophthalmology, Tufts College Medical School, Boston, aged 76; and Dr. BERNHARD FISCHER-WASELS, professor of morbid anatomy at Frankfort-on-Maine, president of the German Pathological Society, editor of the *Frankfurter Zeitschrift für Pathologie*, and well known for his work on cancer research.

Universities and Colleges

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN MEDICAL RADIOLOGY.—*Part I:* Patricia Franklyn, H. H. Hermann, D. D. A. Jayamanne, Elspeth M. Ledlie, T. S. Leedham, M. G. Magan, B. Sandler, L. M. Shorvon.

The title of Reader in Medicine in the University has been conferred on Clifford Wilson, D.M., B.Ch., in respect of the post held by him at the London Hospital Medical College.

UNIVERSITY OF SHEFFIELD

The following candidates have been approved at the examinations indicated:

M.D.—T. R. Forsythe.

FINAL M.B., CH.B.—*Parts II and III:* I. Anderson, H. J. Dooley, Marie France, G. L. Hermitte, P. E. H. Howarth, R. A. McFadden, D. S. Mall, R. E. Peasegood, Ethel W. W. Sharrard, H. J. Whiteley, J. Wilbush, Elena Zadik.

UNIVERSITY OF EDINBURGH

A graduation ceremony was held on April 5, when the following degrees and diplomas were conferred:

M.D.—[1]G. R. Lunn.

PH.D.—M. Y. Ansari, M.B., B.S.

M.B., CH.B.—H. Alá Ud-Din, [1]D. St. J. Bowie, I. A. Brooks, G. Davidson, K. G. S. Davidson, R. A. M. Hamerton, T. A. Hope, H. J. Mackay, A. H. MacKinnon, I. G. Maclean, J. M. G. Parker, R. W. Pettigrew, T. M. Pole, J. Rifkind, A. E. Smith, Margaret M. Timpany.

[1] *In absentia.*

Prof. A. T. Jurasz conferred the first degree of M.D. in the Polish School of Medicine.

Medical Notes in Parliament

The Nation's Milk

During a debate in the House of Lords on April 1 on the remuneration of milk distributors, Lord PERRY said the Ministry of Food now told the consumer that he must buy his milk from a particular tradesman and could only get the sort of milk which that tradesman sold. Tuberculin-tested milk continued to be produced; he himself owned a farm where it was produced. Clean milk, however, produced under ideal conditions in premises frequently inspected was tipped into a common pot along with dirty milk produced by less competent people. That was bad management and an outrage on the consumer. Lord BLEDISLOE said that if methods of production were economized and disease eliminated from the cattle, this country could produce the whole of the liquid milk consumed. In many countries besides Northern Ireland there had been an almost total elimination of bovine tuberculosis as the result of careful and drastic Government administration. Tuberculosis from bovine sources was practically unknown in New Zealand to-day. Lord GEDDES said he feared the Ministry of Agriculture could not deny that clean tuberculin-tested milk was mixed with milk known to be infected with bovine tuberculosis and *Brucella abortus*, the cause of undulant fever, in the Government milk depots. It should be stated in the House that the children's milk was being deliberately contaminated by the Government.

Lord WOOLTON said he was not satisfied with the present position. The tuberculin-tested milk that could find a market was sold as such. The T.T. milk which could not find a market was mixed with other milk. When Lord Geddes had suggested that all other milk which went to children contained those germs he had been too pessimistic. Lord GEDDES intervened to say there had been a statement by the B.M.A., and also, he thought, by the Royal College of Physicians, on this contaminated milk. It was proved by the medical profession that much of the milk produced in this country was infected with bovine tuberculosis and *Brucella abortus*. That milk was being mixed and, without pasteurization, was sold to the children. Lord Geddes added that, as Lord Woolton was to make a statement at an early date, he would not press the matter.

Nurses Bill: Position of Scotland

Mr. HANNAH inquired on April 6 when it was proposed to introduce a Nurses Bill for Scotland. Mr. JOHNSTON said the main purpose of such a Bill would be to establish a roll of assistant nurses, a proposal which the Alness Committee reported against in 1938. In view of the altered conditions since that date he was having discussions with the Scottish nursing and other organizations concerned. He hoped to make a statement shortly.

Medical News

The Ministry of Food announces that from April 18 capsules and tablets made from specially concentrated fish-liver oils will be available for expectant mothers under the vitamin scheme. Each capsule (or tablet) contains 4,000 i.u. of vitamin A and 800 i.u. of vitamin D. They will not be available to children receiving fruit juice and cod-liver oil under the vitamin scheme. The capsules and tablets are to supplement the vitamin A and D intake of expectant mothers. The Ministry has recognized that many mothers could not take the cod-liver oil provided for them and their young children. They will be distributed through the existing chain of distributing centres (welfare centres, clinics, and food offices). Expectant mothers will use the cod-liver-oil coupon sheets obtainable from many food offices in order to get the capsules or tablets. They may take them or cod-liver oil, as they wish. Future supplies of cod-liver oil under the scheme will contain double the present quantity of vitamin D. The new oil will therefore have a minimum vitamin D potency of 200 international units per gramme.

The House of the British Medical Association will be closed from Thursday, April 22, 6 p.m., to Tuesday, April 27, 9 a.m.

The inaugural lecture under the general title of "The Health of the Child" will be given on Wednesday, May 5, at 5 p.m. in King's Hall, King's College, Newcastle, by Prof. J. C. Spence, M.D., F.R.C.P., first holder of the chair. Through the generosity of the Nuffield Provincial Hospital Trustees, Durham is the first university in the Kingdom to establish such a chair. Tickets of admission may be obtained from the Registrar of King's College, Newcastle-upon-Tyne, 2.

At a meeting of the Medico-Legal Society to be held at 26, Portland Place, W., on Wednesday, April 21, at 5.30 p.m., a joint paper will be presented by Drs. J. C. M. Matheson and J. D. N. Hill on electro-encephalography in medico-legal problems.

At a meeting of the Middlesex County Medical Society on Tuesday, April 20, at 3 p.m., at Staines County Hospital, Ashford, Dr. A. G. Signy will speak on "Some Problems in Macrocytic Anaemias" and Dr. D. Court on "The Health of Nurses." Visitors, especially members of the American, Canadian, and other oversea Forces now in this country, will be welcome.

A meeting will be held at the Medical Society of London, 11, Chandos Street, London, W.1, on May 5, at 2.30 p.m., with the object of forming an Association of Physical Medicine. All members of the profession who are interested are invited to attend.

At the meeting of the Medical Society for the Study of Venereal Diseases to be held to-day (Saturday, April 17) at 2.30 p.m., at 11, Chandos Street, Cavendish Square, W., Major Marjorie Bolton, R.A.M.C., will read a paper on the sulphonamide treatment of gonorrhoea in women; and on May 29 Fl. Lieut. J. H. Morton, R.A.F., will discuss infestation by *Trichomonas vaginalis*.

The Royal Victoria Infirmary, Newcastle-upon-Tyne, has sent a circular letter to all medical practitioners in the North-East Region announcing that arrangements have been made for out-patients to be seen by appointment, on the same lines as the system which exists for private consultation. For this purpose an appointments bureau has been established at the Infirmary (telephone No. 21151). Full information is given in the circular. Cases of accident or sudden illness will be treated, as hitherto, at any hour of the day or night. Destitute patients, who have no doctor or no ready means of obtaining one, will be advised and treated according to their needs.

The appointment is announced from Washington of Dr. James A. Crabtree as chief medical officer of the Office of Foreign Relief and Rehabilitation Operations; and three U.S. public health service medical officers have been assigned to North Africa.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* there was little change during the week in the trends of infectious diseases, the only fluctuations of any size being rises in the notifications of acute pneumonia 201 cases, measles 152, and dysentery 26.

The increase in acute pneumonia was general throughout the country, and the incidence has reverted to the high level of the end of January and beginning of February. The only local rise of any size was that of Staffordshire, 38 cases more.

Only small fluctuations occurred in the county totals of scarlet fever, whooping-cough, and diphtheria: the largest were in Lancashire, where increases of 51, 58, and 18 respectively were reported.

The higher incidence of measles was due to a rise in the South. The largest increases recorded during the week were Suffolk 215, London 177, Surrey 173, Glamorganshire 130, Northants 128, Kent 125, Devon 120, Middlesex 114; and the largest declines were those of Yorks West Riding 172, Warwick-

shire 169, Yorks East Riding 116, Essex 125, Sussex 111, Bedfordshire 105, Durham 87, Leicestershire 82.

Although the number of cases of dysentery rose by 26, only one local outbreak of any size was reported—Birmingham C.B. 10 cases. The largest of the county totals were Lancashire 14 (Manchester C.B. 6), Surrey 14 (Godstone R.D. 7), London 10, Yorks West Riding 9.

In *Scotland* a further large rise, 80 cases, was recorded in the notifications of measles. The outbreaks in Edinburgh and Glasgow fell by 21 and 24 cases respectively. The notifications of diphtheria went up by 27, while the figures for scarlet fever and whooping-cough dropped by 26 and 29.

In *Eire* typhus has reappeared after an interval of three months: 7 cases were notified in the rural district of Carrick-on-Shannon No. 1, Co. Leitrim. There were 75 cases of whooping-cough, compared with 29 in the preceding week, the rise being due to outbreaks in Co. Waterford, Waterford C.B. 19, Co. Clare, Kilrush R.D. 15, Co. Wexford, Enniscorthy R.D. 15. In Dublin the cases went up from 13 to 18.

Cerebrospinal Fever

The incidence of cerebrospinal fever during the present year has been the lowest for this period since the outbreak of war. The trend of this disease has been steadily on the downgrade since the large outbreak in 1940. The peaks in the early spring have progressively diminished in size and the intervening endemic level has fallen. A comparison of the notifications for the first twelve weeks of the year is:

Week	Average of 1936–9	1940	1941	1942	1943
1	30	53	232	149	88
2	37	107	266	178	94
3	30	144	287	132	89
4	29	184	307	152	111
5	33	299	332	183	106
6	29	406	345	166	121
7	38	557	376	186	100
8	29	585	430	165	101
9	40	617	406	216	92
10	33	603	365	227	86
11	31	541	332	281	93
12	33	476	334	197	104

Quarterly Returns for Northern Ireland

The birth rate for the fourth quarter of 1942 was 21.8 per 1,000 and was 3.5 above the average rate for the December quarters of the five years 1937–41. Infant mortality was 74 per 1,000 births registered and was 1 below the five-year average. The general death rate was 12.8 per 1,000, compared with 13.0 for the average of 1937–41. The number of deaths attributed to the principal epidemic diseases was 139, compared with 196 for the average of the five preceding fourth quarters. Deaths from pulmonary tuberculosis numbered 204, which was the same as the average, but other forms of tuberculosis accounted for 73 deaths—16 above the average. Of the 4,162 deaths registered during the quarter 12.7% were in persons under one year of age and 50% in persons aged 65 and over.

Quarterly Returns for Eire

The birth rate during the fourth quarter of 1942 was 21.2 per 1,000 and was 3.7 above the rate for the December quarter of 1941. The infant mortality rate was 78 per 1,000 registered births, being 4 above the rate for the fourth quarter of 1941. The general death rate was 13.7 per 1,000, an increase of 1.5 on the rate of the December quarter of the preceding year. The principal epidemic diseases accounted for 502 deaths, compared with an average of 336 for the fourth quarters of 1937–41. There were 745 deaths from pulmonary tuberculosis and 175 from other forms of tuberculosis, compared with averages of 589 and 157 for the five preceding fourth quarters.

For the whole of 1942 the birth rate was 22.3 per 1,000, being 3.3 above the rate for 1941. The infant mortality rate was 68 per 1,000 registered births and was 6 lower than in the preceding year. The general death rate was 14.0 per 1,000, being 0.6 below the rate of 1941. The principal epidemic diseases caused 1,639 deaths, or 280 more than in 1941. Deaths from pulmonary tuberculosis were 3,464 and from other forms of tuberculosis 811; the numbers for 1941 were 2,882 and 829.

The Week ending April 3

The notifications in England and Wales during the week included scarlet fever 2,213, whooping-cough 2,078, diphtheria 798, measles 19,568, acute pneumonia 1,494, cerebrospinal fever 108, dysentery 109, paratyphoid 3, typhoid 15. Influenza deaths in the great towns numbered 67.

No. 12

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended March 27.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943 (a)	1943 (b)	1943 (c)	1943 (d)	1943 (e)	1942 (Corresponding Week) (a)	1942 (b)	1942 (c)	1942 (d)	1942 (e)
Cerebrospinal fever	101	8	31	3	5	198	13	55	2	7
Deaths		2	2				1	3		
Diphtheria	816	37	207	91	25	894	32	199	46	33
Deaths	21	2	1	1	—	23	—	3	3	—
Dysentery	92	10	37		1	125	11	40		—
Deaths		—	—	—	—		—	—	—	—
Encephalitis lethargica, acute	1	—	—		—	6	—	1		—
Deaths		1	—				—	—		
Erysipelas			50	15	3			50	7	3
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years				18						
Deaths	56	5	3	15	7	34	5	10	7	2
Measles	19,561	1,329	718	27	117	3,188	224	280	109	40
Deaths	18	6	5	—	—	4	1	—	—	
Ophthalmia neonatorum	96	5	27	—	—	105	3	25	1	—
Deaths										
Paratyphoid fever	1	—	3	—	1	5	—	1	—	
Deaths	—	—	1	—	—	1	—	—	—	—
Pneumonia, influenzal*	1,505	80	12	16	—	1,258	76	14	4	33
Deaths (from influenza)	73	7	2	1	—	42	5	7		2
Pneumonia, primary			281	33	9			270	25	
Deaths		—		19	15		55			10
Polio-encephalitis, acute	1	—				3	—			
Deaths		—					—			
Poliomyelitis, acute	4	—	—	1	—	5	—	—	1	2
Deaths		—	—				—	—		
Puerperal fever		1	5	2	—		1	32	—	1
Deaths		1					—			
Puerperal pyrexia	191	7	10		1	181	8	21		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,185	156	262	53	39	1,307	45	194	42	24
Deaths	4	—	—	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	6	—	5	5	2	9	—	1	5	2
Deaths	—	—	—	—	—	2	—	1	—	—
Typhus fever	—	—	—	7	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,982	186	224	75	32	1,504	173	46	61	13
Deaths	19	1	1	2	2	10	2	—	2	1
Deaths (0–1 year)	469	55	62	40	42	371	49	75	44	17
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,269	889	606	252	143	4,948	700	714	246	127
Annual death rate (per 1,000 persons living)			13·7	16·6	‡			16·1	16·4	‡
Live births	6,410	786	897	410	349	6,373	691	936	578	256
Annual rate per 1,000 persons living			18·3	27·0	‡			19·4	38·6	‡
Stillbirths	252	19	37			251	31	37		
Rate per 1,000 total births (including stillborn)			40					38		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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ANY QUESTIONS?

Diphtheria in the Immunized

Q.—*A child of six was inoculated with 0.2 c.cm. of alum-precipitated diphtheria toxoid. Three weeks after the injection he developed an acute sore throat with a few punctate septic spots on the tonsils. The boy vomited occasionally; the temperature was 103.5° F.; knee-jerks were present, and there was no albuminuria. Diphtheria bacilli were obtained from a throat swab. I should be grateful for answers to the following questions: (1) In the early days of inoculation against diphtheria is the risk of diphtheria infection increased—i.e., during a negative phase? (2) Granted that the two immunization injections have been given, and that a Schick test is negative, what course should a practitioner follow when presented with a case of sore throat from which diphtheria bacilli are isolated—that is, if no typical membrane is present? (3) Is the appearance of the throat in the case of diphtheria in an immunized person different from the ordinary diphtheria throat in the non-immunized?*

A.—(1) There is no convincing evidence that the immediate risk of diphtheria infection is increased by immunization. Many immunologists regret that the phrase "negative phase," in this connexion, ever escaped from the laboratory, where it is of scientific interest. (2) The practitioner without ready facilities for repeat Schick tests and tests for virulence of the bacilli reported as "positive" would be wise to inject antitoxin as a precautionary measure and to keep the child under observation. With the Pope-Parfentjev modern "enzyme-treated" antitoxin the risk of serum-sickness has become minimal. "If a throat is suspicious enough to demand a swab it is suspicious enough to demand antitoxin." Where a recent Schick test, properly carried out, has been negative the sore throat is probably a streptococcal tonsillitis in an immune diphtheria carrier, and one of the sulphonamides should be prescribed. (3) True clinical diphtheria infection in children who have been properly immunized is rare and mostly trivial in its local and general effect, but typical severe infection with sore throat has been reported in people whose immunity is too low.

A Toxic Eruption

Q.—*A man aged 67 has developed vesicles above the ankles in the area of the socks. They are rather large, with inflammation, swelling, and itching (slight) of the skin. They are exactly like a burn of the first degree. What is the name of this condition? Is it pemphigus? There has been frequency of the bladder for some time, with cloudy and acid urine. Alkalis have been taken for this, with resorcin and hexamine at intervals. What would the best treatment for the condition be?*

A.—Symmetrically disposed large vesicles above the ankles in a man aged 67 are most likely due to a toxic condition; if the patient has frequency he may have retention, with overflow, and it would be wise to have his blood urea estimated. The condition may also result from contact with an irritant, such as a liniment applied to a stiff ankle, so that an external factor must be excluded. When this has been done, and the factors likely to produce toxaemia attended to, the local treatment consists in pricking the blisters with a sterile needle and painting the areas with liq. pic. carb. ℥xv, tannic acid gr. x, aq. ad ℥j; and dusting on simple talcum powder.

Irregular Menstruation

Q.—*Irregular menstruation worries many young adults. What can be done to establish a normal menstrual cycle?*

A.—Irregular menstruation in young adults usually takes one of two forms. The more common one these days with so many girls entering the Services and factories is for amenorrhoea to occur. If the previous menstrual history is normal and the patient fit it is advisable to reassure her and do nothing for three or four months. Many patients when reassured menstruate normally soon afterwards. If the menses do not return give intermittent oestrogenic stimulation. 5 mg. stilboestrol daily for 14 days will usually be followed by bleeding. When bleeding ceases give 1 mg. daily for another 14 days, and repeat this for two or three months. If there is any evidence of thyroid deficiency small doses of thyroid, 1 gr. a day, sometimes give dramatic results. The less common type is when periods come too frequently, possibly with heavy losses. These are more difficult to treat. If the pelvis is healthy the best results are likely to be obtained by giving gonadotrophic hormone. Serum gonadotrophin, 200 to 400 units weekly for three or four weeks, should be tried. Between losses iron should be given, but must be discontinued when bleeding occurs. Excessive losses occasionally require curettage and even transfusion. It should be noted that stilboestrol is more likely to cause harm than benefit in this type of case. Good results can be obtained from male hormone, but its use must be carefully controlled and is better not adopted in general practice.

Treatment of Disseminated Sclerosis

Q.—*Which of the suggested treatments for disseminated sclerosis has the best justification—arsenic, liver injections, vitamin A therapy, etc.?*

A.—Organic arsenicals are widely used to-day in dosages similar to those employed in treating syphilis. It cannot be said that any form of treatment has a specific or certain effect upon disseminated sclerosis, but one gains the impression that cases treated regularly with organic arsenic over a long period progress more favourably than others. Give courses of weekly intravenous injections totalling 5 g. N.A.B., with two-monthly intervals between courses, over a period of 12 to 18 months. Each course should consist of the following weekly injections: 0.15, 0.3, 0.45, 0.6, 0.75, 0.9, 0.9 g. Patients with disseminated sclerosis are particularly liable to sharp febrile reactions after arsenic injections, which should therefore be small to begin with. There is no evidence that liver therapy has any effect and vitamin extracts are of no direct benefit. It is very important in this disease to keep general health and resistance as high as possible to reduce the risk of exacerbations. These are often provoked by intercurrent illness or injury. Vitamin extracts may play their part in this general treatment. In addition to organic arsenic, colloidal gold injections are often used, but with inconclusive results.

INCOME TAX

Housing on Transfer

"DELTA" rented a house when taking up E.M.S. duty at a hospital in 1939. In 1941 he was transferred to another locality, which "necessitated taking a furnished house there," and let the previous house furnished. The authorities claim income tax on the "profit" made on that letting, though owing to the high cost of the furnished house which "Delta" now rents he is at least no better off.

*** There is legal justification for the assessment, as the "profit" is assessable without any deduction for the cost of living elsewhere. (The point was settled by judicial authority in 1912—Wylie *v.* Eccott). The fact that the transfer was compulsory does not assist the taxpayer.

LETTERS, NOTES, ETC.

Enterospasm and Spastic Colitis

Dr. D. M. C. CHURCH (Edinburgh) writes: The answer to the question about enterospasm and colitis (March 27, p. 402) is excellent. I find that if the diet is attended to as suggested a tablespoonful of freshly powdered charcoal taken after the midday and evening meals gives complete relief. Purgatives are forbidden, but if quite essential a small enema containing about a drachm of magnesium trisilicate does no harm.

Treatment of Scabies

Dr. E. D. SPACKMAN (Worthing) writes: As I had a little spare time last evening I picked up the *Journal* for April 3 and the April number of the *Practitioner*. I read carefully Dr. J. R. Graham's article on scabies in the *Journal*, noting his experience in 1,000 cases and his "conclusion" (p. 414): "One treatment with benzyl benzoate will cure over 99% of scabies if efficiently applied. Disinfection of clothing and bedding is unnecessary." Then I opened the *Practitioner*. I read a very detailed article on "Scabies in Children," seven pages, by Dr. Brain, a dermatologist. On p. 236 I read: "Then comes the third essential for success, which is *the disinfection of the clothing*" (the italics are Dr. Brain's, not mine). As the views of two specialists on scabies appear diametrically opposed over the question of clothing disinfection it would be helpful to hear the experience of general practitioners on this matter.

Correction

The strength of the emulsion of benzyl benzoate used for the cases of scabies described by Dr. John R. Graham (April 3, p. 413) was that of the *N.W.F.* emulsion—namely, 25% not 20%.